Radical Service Innovation Capabilities and Competences and its Performance Measurement in the Egyptian Banking Sector

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Tarek El Shafeey

University of Portsmouth
Portsmouth Business School

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VOLUME I OF II
Abstract

Established service firms acknowledge that successful radical innovations are critical to create substantial customer value by satisfying unmet needs, enhance long-term growth and the flows of idiosyncratic asset stocks that create sustainable competitive advantage. Despite these invaluable advantages, the failure rate of these costly and complex innovation initiatives is high and incremental innovation and imitation behaviour dominates most service industries, especially the financial service industry. Given the importance of services and the low performance records of these projects, it was expected that radical service innovation would be considered as a high research priority. Unfortunately, it was not the case.

The central objective of the current research project is to develop a multi-layer (dynamic or evolutionary) conceptual framework for the key capabilities and competences of radical innovation success in the context of the Egyptian banking sector. An analytical, multi-layer conceptual framework was proposed before approaching the empirical study to guide the process of data collection and analysis. This conceptual framework elaborated on the major principles of the competence-based view of the firm. A (retrospective) longitudinal, multi-method, qualitative case study research was designed. Three data collection techniques were used: interviews; documents, and observations. A common framework of data analysis was employed: process narrative strategy; and synthetic strategy.

The findings show that key to the success of radical service innovation is a complex set of capabilities and competences. These are: entrepreneurial (resource building) capability, theoretical (second-order) construct; core radical innovation competence, superordinate (third-order) construct; incubation capability, theoretical (third-order) construct; and acceleration capability, theoretical (third-order) construct. Moreover, the success/performance of radical innovation is assessed through four categories of constructs. The first category is temporary competitive advantage (TCA), which may be: effectiveness advantage; or efficiency advantage. The second category is sustainable competitive advantage (SCA). The third category is a set of imitation barriers. The fourth category is the superior long-term financial performance. The findings show that the entrepreneurial (resource building) capability is causally linked to the core radical
innovation competence, which is causally linked to both the incubation and acceleration capabilities. The findings also show that the incubation capability is causally linked to acceleration capability. The acceleration capability, on the other hand, is causally linked to TCA. The findings also show that the TCA-SCA relationship is contingent, and moderated by imitation barriers. Moreover, the SCA is causally linked to the superior long-term financial performance. Finally, the superior long-term financial performance is causally linked to core radical innovation competence.

The current research project contributes to several streams of the literature in four main ways. First, it develops a process model for a radical service innovation project, from its inception to introduction. This model is developed based on a radical innovation at the national level: the National Program for Vehicle Replacement (NPVR), which is seen as success story in a developing country. Several national and international banks have played key roles in the incubation and acceleration phases of this program. Second, it delivers a set of original theoretical constructs (manifested by a consistent and comprehensive set of 72 first-order latent factors), and the propositions linking these theoretical constructs. Third, it identifies 13 criticisms for one of the most widely adopted theory within the (entrepreneurship, innovation, and strategic management) literature, the resource-based view (RBV) of the firm. Finally, it reinforces one of the least employed research methodologies, longitudinal qualitative research based on process data.
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Author’s Declaration

 Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.
Dedication

I dedicate my work to my Creator,
I hope to have started this work with pure intentions, and strive to end it similarly. I hope my God accept my effort, and look upon me with contentment and mercy, and that the others benefits from any of knowledge I have produced.
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Chapter 1 Introduction

1.1 Importance of Services

Service can be defined as an act, deed, performance, effort, or process introduced to a client, in return of an expense. The utility lies in the nature of the performance which might require supportive goods to be useful (Rathmell, 1966: 791). Services are solutions to prospective customers’ needs (den Hertog et al., 2010; Gadrey et al., 1995; Lovelock and Wirtz, 2007). Services have become an integral part of modern societies. The service industries include a wide range of industries such as hospitality; tourism; financial services; education services; retailing and distribution; transportation, communication; leisure, recreation and entertainment; and professional and business services, including accountancy, marketing, and law (Lovelock and Wirtz, 2007: 34). Furthermore, services are the main growth engine of the global economy, driving productivity, economic growth and employment in countries which have traditionally relied on manufacturing (e.g., Cook et al., 1999: 422; den Hertog, et al., 2010; Page and Schirr, 2008: 244; Salunke et al., 2011). For example, in 2008, service sectors accounted for 64% of the General Domestic Product (GDP) and 39.4% of jobs (Central Intelligence Agency, 2009).

1.2 Importance of Innovations for Service Industries

Due to the environmental turbulence represented in slower economic growth, deregulations, fierce competition, rapid technological changes, demographic shifts, increased diversification, pressures for productivity, and increased emphasis on quality, service industries have undergone substantial changes over the last decades. To cope with these changes, service firms have had to undertake a steady stream of incremental and radical innovations (Buganza and Verganti, 2006; Makadok, 1998).

Radical innovation (RI) is of particular importance. It is argued that successful RI initiatives create the competitive advantage of the future (Abernathy and Utterback, 1988; Chandy and Tellis, 1998; Hunt and Morgan, 1995; Salomo et al., 2007; Sorescu et al., 2003; Veryzer, 1998). They enable firms to enhance their flexibility through the ability to reorganize and react to external stimuli, create substantial customer value by satisfying unmet needs, enhance growth opportunities through the creation of a whole range of service families opening up new markets and market segments, and enhance
the flows of idiosyncratic asset stocks that create sustainable competitive advantage (Buganza and Verganti, 2006; Leifer et al., 2000; McGrath and Ming-Hone, 1996; Song and Montoya-weis, 1998). Therefore, RIs are increasing in frequency, and many managers are turning to RI to support firm growth, and many governments are emphasizing RI as a means of creating national economic growth (Chandy and Tellis, 1998, 2000; Story et al., 2011).

Furthermore, according to the ambidexterity hypothesis, superior incremental innovators need also to implement radical innovations (Atuahene-Gima, 2005; Damanpour et al., 2009; He and Wong, 2004; O'Reilly III and Tushman, 2004; Stringer, 2000). In other words, continuous incremental innovations with periodic radical innovations are imperative (Leifer, et al., 2000; March, 1991; McDermott and O'Connor, 2002; O'Connor et al., 2002). Research in new product development (NPD) and new service development (NSD), organizational design, organizational adaptation, organizational learning, competitive advantage, and organizational survival has shown that formulating and implementing both radical and incremental innovation strategies is critical (Gupta et al., 2006; O'Reilly III and Tushman, 2004). For example, March (1991: 71) argues that both the exploration of new possibilities and the exploitation of old certainties are essential for organizational survival and prosperity. Organizations that engage in exploitation to the exclusion of exploration are likely to find themselves “trapped in suboptimal stable equilibria” as “the improvements in competence at existing procedures make experimentation with others less attractive”.

1.3 The Current State of Knowledge and Gaps

Despite the economic importance of services (e.g., being the main growth engine) and the obvious advantages of successful major innovations (e.g., creating the competitive advantage of the future), most successful enterprises are adept at incremental innovation, but they “falter” when it comes to pioneering radically new products and services (Leifer, et al., 2000; O'Reilly III and Tushman, 2004: 74; Stringer, 2000). The failure rate of these costly and complex innovation projects is somewhere between 40 and 70 percent, which makes the development of highly innovative products/services a high-risk venture (de Berntani, 2001; Herrmann et al., 2006; Joshi and Sharma, 2004; O'Connor and DeMartino, 2006; Story, et al., 2011). Given the importance of services and the low performance records of these major innovation projects, it was expected
that radical service innovation would be considered as a high research priority. Unfortunately, this is not the case. Service innovation in general and radical service innovation in particular has received little attention in innovation research.

Several meta-analysis, content analysis, conceptual review, and empirical assessment studies have been conducted to formally assess the growth and development of knowledge within the disciplines of organizational change and innovation (e.g., Lengnick-Hall, 1992; Montoya-Weiss and Calantone, 1994; Page and Schirr, 2008; Van de Ven and Poole, 2005; Wolfe, 1994), and strategic management (e.g., Armstrong and Shimizu, 2007; Newbert, 2007). The main focus of these studies is to conduct a comprehensive review of the articles published in leading journals in the disciplines, covering key attributes such as the topics explored (e.g., NPD vs. NSD; RI vs. incremental innovation), the methodology employed (e.g., cross-sectional vs. longitudinal), and the domains of knowledge utilized when identifying the real sources of sustained competitive advantage (the resource-based view of the firm, the capability-based view of the firm, and the competence-based view of the firm). The aim of these studies is to identify promising topics, methodologies, and domains of knowledge, accelerating the forward movement of the disciplines of innovation and strategic management. By reviewing these studies, among others, I have been able to identify the following four major gaps (summarized in table 1.1).
Table 1.1: Summary of the Literature Gaps in the Research Area

<table>
<thead>
<tr>
<th>Topic, Methodology, and Domain of Knowledge</th>
<th>The Knowledge Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Competence-based view of the firm (Domain of Knowledge)</strong></td>
<td>This view (or body of research) is the least utilized within the strategic management although competences are far more significant in explaining CA. To illustrate, there are three well known schools of thought within the resource-based competition paradigm. Two schools are of particular importance: (1) the resource-based view of the firm (also known as the RBV, and VRIN — valuable, rare, inimitable, non-substitutable— framework); and (2) the competence-based view of the firm (also known as the social constructionist school). When investigating the real sources of competitive advantage in any topic, like innovation, scholars ground their hypotheses on one or more school of thought (Arnstrom and Shinizu, 2007; Makadok, 2001; Newbert, 2007; Seoudi, 2009). By investigating the level of utilization of each school of thought, Newbert (2007: 128) finds that “[RBV] is by far the most widely utilized”. Out of the 549 tests analyzed, “430” hypotheses (representing 78 percent) are found to be grounded on the RBV framework, with the competence-based approach being the least employed approach in empirical research, although “capabilities and core competencies have been found to be far more significant in explaining competitive advantage and performance than resources”.</td>
</tr>
<tr>
<td><strong>Service innovation (Topic)</strong></td>
<td>The majority of innovation studies concentrate on industrial innovation despite the economic importance of services. For example, Montoya-Weiss and Calantone (1994: 400) state that “there is a clear bias toward surveying industrial organizations”. Service firms surveyed represent nearly 6.4% (3 firms out of 47 firms). More recently, Page and Schirr (2008: 244) state that “the most surprising finding . . . was the paucity of research on new service development . . . [although] it would seem likely that research on new service development would be a significant share of new product development research. Therefore, it should be surprising that only 52 of the 815 articles [6.4%] in the data set even included services and that only 21 articles [2.6%] focused on new service development”.</td>
</tr>
<tr>
<td><strong>Radical innovation (Topic)</strong></td>
<td>Most of the studies concentrate on incremental innovations despite the obvious advantages of radical innovation and the low performance record of these innovations (Damanpour, et al., 2009; McDermott and O’Connor, 2002; Veryzer, 1998). For example, Page and Schirr (2008: 241) find that about “7%” (57) of the articles surveyed concerns several aspects related to RIs which places it the 5th of the 42 research streams highlighted in the 815 articles.</td>
</tr>
<tr>
<td><strong>Longitudinal research (Methodology)</strong></td>
<td>Longitudinal research is rare, and cross-sectional research dominates the fields of strategic management, organizational change, innovation, and entrepreneurship, despite the obvious advantage of this type of research (Damanpour, et al., 2009; Lumpkin and Dess, 1996; Lyon et al., 2000; Van de Ven and Poole, 2005). For example, no longitudinal quantitative research has been conducted on the key determinants of innovation performance (Montoya-Weiss and Calantone, 1994). Also, Wolfe (1994) finds that, when identifying the determinants of an organization’s propensity to innovate, variance research (based on survey data) dominates the innovation research, and very few longitudinal qualitative research has been conducted. Still, more recently, Page and Schirr (2008: 244) find that longitudinal studies are “rare, and there is no evidence of an increasing trend”.</td>
</tr>
</tbody>
</table>

Source: Self.

These four findings deserve more attention as they represent a motivation for doing the current research, and will frame the focus, level, and scope of the current research project.

1.3.1 The Competence-based View of the Firm

Generally speaking, there are two counter resource-based views of the firm (two views of resource-based competition, or two views of internal antecedent-based superior performance) that have been identified in the strategic management literature. The first is the capability-building mechanism, and has been codified into the competence-based view (CBV) of the firm, also known the proactive type of entrepreneurship. The second
is the resource-picking mechanism, and has been codified into the resource-based view (RBV) of the firm, also known as the acquisitive type of entrepreneurship (Lado et al., 1992; Makadok, 2001; Seoudi, 2009).

Both schools have counter assumptions regarding the nature of strategic resources (the antecedents of superior performance), and the role of strategic managers (entrepreneurial executives). Four main features characterize the CBV. First, strategic managers are entrepreneurs and resource builders. Second, strategic resources are asset stocks that are proactively accumulated internally. Third, strategic resources are embedded (higher-order or theoretical concepts). Fourth, strategic resources may be complementary, interconnected and mutually reinforce each other. Contrary to the former school, the RBV is characterized by the following. First, managers are conceived as rational, optimizers, and stock-pickers. Second, strategic resources can be proactively acquired from the strategic factor market. Third, strategic resources are conceived as elementary resources rather than higher-order theoretical concepts. Fourth, strategic resources are treated as singular distinct items rather than a bundle of resources that gives a synergistic result (Black and Boal, 1994; Dierickx and Cool, 1989a, 1989b; Lado, et al., 1992; Madhavaram and Hunt, 2008; Makadok, 2001; Penrose, 1959; Seoudi, 2009).

Thus, each school of thought directs a scholar attention toward counter issues (Lado, et al., 1992), such as building asset stocks vs. picking and deploying resources; higher-order resources vs. elementary resources; interconnected, complementary resources vs. singular distinct items; and managers as entrepreneurs and resource builders vs. managers as optimizers and stock-pickers. However, despite the calls made by many scholars within the strategic management field to adopt the capability- and competence-based views, most of the empirical works have been static in nature, elaborating on the RBV. In other words, the fact that the RBV dominates the field of strategic management (with the competence-based view (CBV)) being the least utilized approach in empirical research) represents a major dissatisfaction among the scientific community (Armstrong and Shimizu, 2007; Kraaijenbrink et al., 2010; Newbert, 2007; Priem and Butler, 2001a, 2001b).
1.3.2 Service Innovation

It is surprising to find that the percentage of service innovation research (6.4%) has not been increased despite the economic important of service industries, being the main growth engine of the global economy. In fact, several scholars within the service innovation literature have expressed similar concern. For example, Sundbo (1997: 433) states that “the literature on innovation in services is sparse, and it does not discuss the problem fundamentally”. Alam (2002: 250) states that “limited empirical evidence exists about how new services are developed because the literature is still embryonic in nature”. Menor and Roth (2007: 825) state that NSD “has remained among the least understood topics in the service management and innovation literature”. Damanpour, et al. (2009: 668) state that “innovation research has a long way from having a satisfactory picture of the extent, role and nature of innovative activities in the service sector”. Salunke, et al. (2011: 1251) argue that, even service innovation is distinct from manufacturing innovation, “service innovation thought is still largely based on a manufacturing mindset”.

1.3.3 Radical Innovation

RI research occupies the fifth place in the innovation research streams despite the obvious advantage of RI and the low performance records of these costly and complex organizational initiatives. This may be due to that radical innovations are rare in occurrence. It has been suggested that only 7-10% of all new industrial innovations fall into the category of radical innovations (Garcia and Calantone, 2002: 120; Leifer, et al., 2000; McDermott and O’Connor, 2002; Sorescu, et al., 2003; Veryzer, 1998). Most of the RI research, however, has been undertaken in the industrial context, and very little research has been undertaken in the service context. This may be due to that RI is rather rare in the service context. In fact, several scholars (e.g., Alam, 2006; Damanpour, et al., 2009; Easingwood, 1986; Hooley and Mann, 1988; Kelly and Storey, 2000; Morris and Westbrook, 1996; Oke, 2007; Salunke, et al., 2011) confirms the notion that the majority of new services developed have been incremental innovations and me-too/copy-cat products and services.

One significant dissatisfaction among the scientific community is the lack of an integrative, evolutionary (dynamic or multi-layer) conceptual framework that addresses the interrelationships among the drivers (capabilities and competences), and links these
drivers to radical innovation success. In fact, several scholars have called for developing such a comprehensive (evolutionary) conceptual framework that: is “wide enough to encompass and link the relevant variables and their effects”; and “knit together and give structure to what we know and extend our knowledge beyond particular [“semi-isolated”] facts” and the many “disjoint theoretical frameworks”, which does not “tie together the various pieces to achieve an integrated broader perspective” (Chandy and Tellis, 1998; Nelson and Winter, 1977: 41; O’Connor and DeMartino, 2006; Salomo, et al., 2007; Veryzer, 1998). For example, Lengnick-Hall (1992: 425) calls for developing evolutionary, causal, integrative conceptual frameworks for corporate entrepreneurship capturing the interaction between: the way by which corporate competences are built and configured; innovation is managed; and competitive advantage is generated. Moreover, she states that these conceptual models “must be articulated in such a way that can be subjected to empirical investigation”. Herrmann, et al. (2006) state that considerable research is required if further light is to be shed on the determinants of RI and the interrelationships among them, and their relationships to performance. In a similar vein, Salunke et al. (2011: 1260) state that there is a need for a conceptual model that captures the antecedents of service innovation-based competitive strategy from the perspective of capability- and competence-based views, and that “this need represents a substantial void”.

Thus, several scholars have called for developing a unifying, evolutionary conceptual framework, stipulating a complex chain of constructs and variables over an extended period of time. Due to the wide nature of this knowledge gap, it is essential to stratify this wide gap into a set of layers. Layer I (LI) addresses the questions related to the capabilities and competences needed to be built before the initiation of RI projects. Layer II (LII) addresses the question related to the capabilities required to be able to effectively manage RI projects. Layer III (LIII) addresses the question related to the success/performance measurement of RIs. Thus, LIII addresses the competition process that unfolds after the introduction of RIs.

**LI: The capabilities and competences required before the initiation of RI projects**

Research in NPD, NSD, organization theory, and marketing has shown that initiating RIs require the accumulation of a specific competence which is different from the one required for initiating incremental innovations. For example, He and Wong (2004: 484) differentiate between “explorative innovation strategy” driving radical innovations, and
“exploitative innovation strategy” driving incremental innovations. Atuahene-Gima (2005: 61) also differentiates between “competence exploration” giving rise to radical innovations, and “competence exploitation” giving rise to incremental innovations.

Leonard-Barton (1992: 122) contributes to this stream of research by developing what she calls core NPD competence, a higher-order concept manifested by four interrelated, interdependent (“tightly coupled”) dimensions. These are: the skills and knowledge embodied in people; knowledge embedded in technical systems; managerial systems; and corporate culture (the often overlooked dimension). She argues that accumulating and institutionalizing such a core competence is significant for the performance of major innovations. She, however, focuses on core NPD as a significant driver for major industrial innovations. Despite the wide use of the concept, past research does not either elaborate and further develop the dimensions of the core NPD competence, or extend this concept to radical innovation in the service context. In other words, there is a lack of research that examines the dimensions of Core Radical Innovation Competence (Core RIC) in the service context.

On the other hand, a core proposition of the CBV is that strategic managers and entrepreneurial executives are responsible for constructing core competences and strategic resources (e.g., Core RIC) that will drive future RI projects (Atuahene-Gima and Ko, 2001; Hamel and Prahalad, 1989; Lado, et al., 1992; Makadok, 2001; Penrose, 1959). In this respect, the majority of innovation and entrepreneurship research (e.g., Moreno and Casillas, 2008; Salunke, et al., 2011) has tended to use three dimensions of entrepreneurial orientation (innovativeness, proactiveness, and risk taking) when linking entrepreneurship to capabilities and competences driving innovation. Moreover, past innovation and entrepreneurship research has tended to ignore the process by which entrepreneurial executives build core competences and strategic resources. As result, the entrepreneurial (resource building) capability required to build Core RIC has remained among the least empirically investigated capability in innovation and entrepreneurship research. In fact, several scholars (Priem and Butler, 2001a; e.g., Van de Ven, 1992; Van de Ven, 2007; Van de Ven and Poole, 1990) identify the process by which strategic resources is accumulated as a black box, and call for opening this black box by investigating the processes by which strategic managers build strategic resources. These scholars state that such research would allow the creation of the entrepreneurial (resource building) capability construct that captures the complexity of the
accumulation process. In a similar vein, Sirmon et al. (2007: 274) and Ellonen et al. (2009) state that “the processes by which firms obtain or develop, combine, and leverage resources to create and maintain competitive advantages are not well understood”, especially that the accumulation of innovation related capabilities and competences seems to be strongly path-dependent.

Thus, if we have not sought to observe or retrospectively investigate the processes (mechanisms) by which the Core RIC built in reality, and if we do not take into considerations the attributes of the Core RIC itself, how we will be able to define the dimensions of the entrepreneurial (resource building) capability. In other words, there is a lack of research that examines the dimensions of entrepreneurial (resource building) capability seeking to create the Core RIC. In short, the Core RIC (and its lower-order dimensions), in addition to the entrepreneurial (resource building) capability required to building this core competence have remained among the least addressed research questions within the service innovation literature.

LI1: The capabilities of RI project management

While Core RIC has been suggested to be key to the RI success, it is not sufficient. In terms of the process, radical innovation develops through several distinctive phases. Thus, RI requires the development of several distinctive capabilities accumulated through “innovation-based corporate entrepreneurship” (e.g., O'Connor and DeMartino, 2006; Story, et al., 2011: 954). In this respect, past research has shown that the development process for incremental innovation is fundamentally different from the development process of radical innovation. For example, in their quantitative studies, He and Wong (2004) and Atuahene-Gima (2005) find that the exploitation activities differ strikingly from the exploration activities. Moreover, de Brentani (2001) and Salomo et al. (2007) find that the true and tried, well-recognized project management techniques such as Stage-Gate system and formal, highly structured processes are significant predictors for incremental innovation success. They, however, are not significant in explaining radical innovation success. In a similar vein, past qualitative research (e.g., O'Connor and DeMartino, 2006; O'Connor, et al., 2002; Story, et al., 2011; Veryzer, 1998) sought to address the process of generating and adopting radical innovations in the industrial contexts, find that the activities associated with the development of continuous innovations are rarely possible and not constructive during the early development of radical innovation, and may discourage major innovations. In
fact, all these innovation scholars state that while considerable knowledge has been accumulated about incremental or continuous innovation, there has been very little research focused on radical innovation. As a result, we know considerably less about the effective management of the new product development process in the radical than in an incremental context.

Few attempts have been made to examine the capabilities of managing radical innovation projects. Of particular importance are the studies of O’Connor and DeMartino (2006) and Story et al. (2011). They identify three distinctive project management capabilities: discovery (direction) capability; incubation capability; and acceleration capability. They argue that these distinctive capabilities are keys to the RI success. It should be noted, however, that all the intensive studies reviewed have focused on radical industrial innovation, and there has been a lack of intensive research addressing the same phenomena within the service context. Thus, the extent to which these project management capability frameworks are applicable to service innovation is an empirical question. Furthermore, the discovery-incubation-acceleration capability frameworks of project management have been mainly descriptive, and there has been a lack of research sought to further develop these capability constructs by examining their lower-order dimensions. Of particular importance is the incubation phase. O’Connor and DeMartino (2006) state that teams are found to struggle with many technical and market uncertainties during the incubation stage. The majority of radical innovators lack a mature incubation capability, and thus incubation appears to be the most fragile and least understood of the three capabilities. In short, the nature of RI project management in the service context has remained empirically uninvestigated, and the capabilities of managing radical service innovation projects have remained under-researched question. In other words, there is a lack of research that examines the capabilities of radical project management in the service context.

LIII: The success/performance measurement of radical service innovations

As stated previously, it is argued that RI, if successful, creates the competitive advantage of the future. Despite this, very little research has sought to assess the success of radical initiatives in innovation research in general (O’Connor and DeMartino, 2006; Veryzer, 1998), and radical service innovation research in particular. Chandy and Tellis (1998) state that the issue of analyzing the performance of radical innovation in terms of profits and market share warrants further study. Sorescu (2003: 82), state that “virtually
nothing is known about their [“radical innovations”] performance and financial value”. Herrmann, et al. (2006) state that considerable research is required if further light is to be shed on the RI performance.

Of particular importance is that, when addressing innovation success, imitation barriers are either ignored or assumed to exist. This, however, represents a significant deficiency of past research. As argued by several theories of competition, imitation barriers represent isolating mechanism that brings important information to the analysis of success (Bharadwaj et al., 1993; Hunt, 2000a). Moreover, Nelson and Winter (1977) argue that any useful theory of innovation should take imitation into consideration. Furthermore, Garcia and Calantone (2002) argue that the imitation behavior should be taken into consideration and imitative innovations should not be underrated. In fact, they argue that imitators can play a major role in remaking or creatively destroying the market. Taking into consideration imitation barriers is of particular importance as service innovation research (e.g., Morris and Westbrook, 1996; Salunke, et al., 2011) has shown that the imitation behavior dominates service industries in general and the financial service industry in particular. In short, more qualitative research is needed to understand the success of radical service innovations, and how radical innovators are able to protect the competitive advantage resulting from these innovations as the competition process unfolds.

1.3.4 Longitudinal Research

The fact that longitudinal research is rare represents a major dissatisfaction among scholars within the fields of entrepreneurship, organizational change and innovation, and strategic management (e.g., Damanpour, et al., 2009; Kraaijenbrink, et al., 2010; Lumpkin and Dess, 1996; Lyon, et al., 2000; Page and Schirr, 2008; Priem and Butler, 2001a; Tsoukas and Chia, 2002; Van de Ven and Huber, 1990; Van de Ven and Poole, 2005; Wolfe, 1994). In the field of organizational change and innovation, longitudinal research could be conducted in both quantitative (Montoya-Weiss and Calantone, 1994) and qualitative studies. Of particular importance here is how longitudinal research is conducted in qualitative studies. This research involves in-depth, longitudinal research conducted to fully describe the sequence of innovation processes. It seeks to document events, activities, steps, and choices ordered over time (“chronology” or “process narrative”). This research often involves theory building and qualitative data collection.
Building theories from process data has two main advantages: it enables researchers to develop new variables and constructs that could “only be detected” through “close contact with real processes”; and it provides a high level of explanation through the identification of causal links involved in the processes as these causal links are more explicitly traceable (Langley, 1999: 704; Robson, 2011; Van de Ven and Poole, 1990; Wolfe, 1994).

All in all, several recent conceptual review, content analysis, meta-analysis, and empirical assessment studies have been reviewed to identify promising topics to be investigated, methodologies to be employed, and bodies of theories to be utilized. These studies show that there is a lack of research employing longitudinal methodology and elaborating on the CBV of the firm when investigating the key capabilities and competences of radical service innovation success, despite the advantages of this methodology and this school of thought, and the low performance records of these costly and complex organizational initiatives. In other words, there is a lack of longitudinal qualitative research on the key capabilities and competences of radical innovation success in the service context.

To update (and also triangulate and extend) the findings concluded from the previous studies, I have conducted a search in some of the most famous databases in social sciences. The search covered the period until December 2010, and included the following databases: Business Source Premier (All Publication Type); Science Direct (All sources); ProQuest (Dissertations & Theses, and Scholarly Journals); and EThOS (Electronic Theses Online Service). The search results are shown in Table 1.2.

<table>
<thead>
<tr>
<th>Type of Research</th>
<th>Type of Industry*</th>
<th>Competence (or capability) Constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>Manufacturing (NPD)</td>
<td>RI** 12</td>
</tr>
<tr>
<td>Qualitative</td>
<td>Services (NSD)</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32</td>
</tr>
<tr>
<td></td>
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<td>9</td>
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<td>0</td>
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</table>

Table 1.2: Radical Innovation Competences based on Longitudinal Research

Source: Self.

* The search is limited to the large mature industrial and services firms (e.g., SMEs are excluded). Also, the total number of quantitative and qualitative research (39 articles) is less than the total number of manufacturing and services (41) because two studies covered both types of industries.

** Radical innovation (other concepts used also were breakthrough innovation, discontinues innovation, new-to-the world innovation, revolutionary innovation, and major innovation).

Several points, however, deserve more attention. Regarding the type of industry, 32 longitudinal studies have investigated several aspects of RI in several manufacturing
industries. This confirms the finding that RI in the service context is under-researched topic, and there is a bias toward studying the topic within the industrial context. *Regarding the competence constructs,* none of the longitudinal qualitative studies, undertaken in the service context, has sought to track the evolution of a radical service innovation project from its inception through growth stage. Also, the few longitudinal qualitative studies (based on process data), undertaken in the manufacturing context, have not sought to develop RI competence constructs. In short, the search undertaken in the stated databases supports the main knowledge gap that *there is a lack of an integrative, evolutionary conceptual framework on the key capabilities and competences of radical service innovation success.*

Based on the previous discussion, it is concluded that there is a lack of well-developed and tested theories (based on process data and elaborating on the principles of the competence-based view) that enable us to understand and explain radical service innovation and its key success/performance measurement. Such a lack of empirical research, thus, justifies undertaking more research effort in theory building. As stated by Colquitt and Zapata-Phelan (2007: 1282), Yin (2009: 37), and Robson (2011), when the knowledge base of the subject is “novel” or “poor”, and there are no empirical articles that provide “interim struggles” that can help scholars forward toward stronger theories, building conceptual frameworks (theoretical constructs and propositions) is justified.

### 1.4 The Research Questions

The overreaching research question is: *What are the key capabilities and competences of radical innovation success in the Egyptian banking sector?* This research question can be stratified into three layers:

**LI: The capabilities and competences required before the initiation of RI projects**

1. *What are the dimensions of entrepreneurial (resource building) capability required to build the core radical innovation competence (Core RIC)?*
2. *What are the dimensions of Core RIC that need to be accumulated before the initiation of radical service innovation projects and how such core competence could be accumulated?*

**LII: The capabilities of RI project management**
3. What are the capabilities required to effectively manage RI projects in the service context?

LIII: The success/performance measurement of radical service innovations

4. What are the key success/performance measurement of radical service innovation and how such success could be sustained?

1.5 The Research Objective

The central aim of the current research project is to initiate the growth cycle of a dynamic model by developing an evolutionary (multi-layer) conceptual framework for the key capabilities and competences of radical innovation success in the Egyptian banking sector. More specifically, the central objective could be decomposed into two sub-objectives:

- To develop the theoretical constructs of radical innovation capabilities and competences and its key success/performance in the Egyptian banking sector;
- To develop the causal links among these theoretical constructs.

The purpose of the current research, thus, is to explore and explain the phenomenon of radical service innovation in the context of the Egyptian banking sector. In doing so, this research project will employ a longitudinal research design and elaborate on the major principles of the competence-based view of the firm. Achieving the central research objective, thus, represents an interesting opportunity to advance our knowledge regarding the previously identified knowledge gaps.

1.6 Original Contribution to Knowledge

RI is generally described as a costly and complex strategic organizational practice. Thus, the significance of the current research lies in its potential to develop a multi-layer (dynamic or evolutionary) conceptual framework that addresses a chain of linked capabilities and competences related to radical service innovation, and links this chain to the success/performance of these initiatives. This is expected to lead to better understanding of such complex phenomenon. More specifically, the current research project is expected to produce a set of theoretical and practical contributions.

From a theoretical perspective, such dynamic conceptual framework contributes to the literature of entrepreneurship, radical (service) innovation, and strategic management in
several ways. First, it delivers an original, consistent, and comprehensive set of RI related capability and competence constructs (LI and LII). Second, the development of theoretical propositions linking these constructs is considered as another theoretical contribution. In doing so, the development of this multi-layer conceptual framework can push the development of more “rigorous theory” by enabling future research activities on a quantitative basis (Lengnick-Hall, 1992; Porter, 1991: 98). Third, the current research project elaborates on the most recent school of thought within the innovation literature (the characteristics-based approach). This approach contributes to the innovation literature in several ways, and it is strongly recommended to be widely adopted in empirical research (Castellacci, 2008; de Vries, 2006; Drejer, 2004). As very few longitudinal studies have sought to adopt this approach, the current research will show how such an approach is operationalized in practice (e.g., by discussing the evolutionary nature of a real RI project in terms of characteristics). Fourth, the current research project identifies 13 criticisms directed at the RBV (the most widely invoked theory within the entrepreneurship, innovation, and strategic management literature).

Although the current research problem is framed from the point of view of the academic community, it also contributes to practice. Longitudinal research (based on process data) seeks to follow the temporal sequence of: the accumulation of the Core RIC; the management of RI project; and the competitive situation resulting from the RI. As mentioned previously, such a temporal sequence opens the proverbial black box of the RI journey and provides a road map guiding the entrepreneurs, and the developmental and marketing managers during this organizational practice. It is expected, thus, that such dynamic conceptualization will make the RI journey more manageable, and minimizes the high failure rate associating these costly and complex organizational practices.

The current research project has also three important implications for policy makers. First, RI is associated with the creation of new business model, a value chain in which several partners participate in introducing the radically new product/service by filling positions in this value chain (Afuah and Bahram, 1995; de Vries, 2006; Gallouj, 2002; Leifer, et al., 2000; Windrum and García-Goñi, 2008). Thus, RI has an important implication on the national level (e.g., creating new industries, being an engine of economic growth, and creating new job opportunities) (Chandy and Tellis, 2000). Second, the public sector may participate not only in the production of RI
(collaboration), but also in the implementation of this innovation (by filling a position within the new business model). Thus, the competences of LI and LII will not only provide deeper knowledge and understanding to practitioners, but also inform the public sector units that may participate in these RI projects (Story, et al., 2011). Third, LII of the conceptual framework will be based on the documentation of the *Egyptian National Program for Vehicle Replacement* (NPVR), which has been led by a group of national and international banks. This NPVR is based on a new-to-the-world scheme (Program of Activities), and thus will be “the first registered transport-sector Program of Activities under the UNFCCC Clean Development Mechanism system worldwide (The World Bank, 2010a: 17). (Please note that UNFCCC denotes United Nation Framework Convention on Climate Change.) That is why the NPVR is getting more international attention, and governments in developing countries (e.g., Morocco and Mexico) have expressed interest in launching similar programs (ESMAP, 2010: 9). Thus, the lessons learned, the crises faced, and the solutions suggested will have critical implication for these countries in which old vehicles represent a great and unsolved challenge.

### 1.7 Overview Methodology

To present a simpler and well integrated picture of the research methodology, I need to emphasis the link between the research questions, conceptual framework, data collection techniques and analysis procedures, and research findings. An analytical conceptual framework intended to answer the research questions set in the introductory chapter is proposed (Chapter 5). Developing a conceptual framework before approaching the field study is strongly recommended by notable methodologists because such a preconception guides not only data collection, but also data analysis (Miles and Huberman, 1994; Yin, 2009). However, the lack of longitudinal qualitative research on the key capabilities and competences of radical innovation success in both the industrial and service contexts has made the construction of this basic framework a very difficult theoretical task. In this respect, I have elaborated on the tool of “thought experiments” or “thought trails”, which is considered as a valuable tool when developing conceptual frameworks, and would make the preconception conceptually coherent, and also would bring breakthroughs to the conceptual development (Langley, 1999; Maxwell, 2008; Van de Ven, 2007; Weick, 1989: 522).
Data collection techniques and analysis procedures represent the central link between the proposed conceptual framework (Chapter 5) and the modified conceptual framework (Chapters 7-10). A case study protocol was designed in which the proposed framework was translated into a set of interview questions, semi-structured interviews (Maxwell, 2008; Yin, 2009). The key informants were also asked to present a sequence of documents, extending back in time, to satisfy the longitudinal nature of the study (Robson, 2011). Also, a very limited amount of data was collected using a third technique, observation. Thus, the proposed conceptual framework guided the data collection process. The case study protocol had an evolutionary nature, satisfying the flexible design followed when building theory (Robson, 2011; Yin, 2009). A common framework of data analysis was employed: narrative strategy; and synthetic strategy. This narrative, however, constituted an “initial” rather than final step in theory building. It served as an “intermediary” database for the creation of constructs and the formulation of propositions linking these constructs (Langley, 1999; Wolfe, 1994). The analytical conceptual framework guided the synthetic strategy (Robson, 2011; Saunders et al., 2009). The results of this common framework are presented in Chapters 7-10.

1.8 The Role of Banks in the RI Project Investigated

All the three layers of research questions are sought to be addressed at the banking level. After developing the proposed conceptual framework and the case study protocol, I conducted a pilot study to (among other reasons) identify the RI projects undertaken within the Egyptian banking sector from which the project management capabilities (LII) would be concluded. Unfortunately, I did not find any RI project sought to introduce RI product/service at the banking level during the last 10 years. There was only radical service innovation project at the national level: the Egyptian National Program for Vehicle Replacement (NPVR) intended to solve a great national challenge, and satisfy unmet customer and societal needs. The NPVR sought to develop a replicable vehicle replacement scheme (Program of Activities). Thus, although the vehicle replacement idea itself is not new to the world, the scheme of NPVR is considered as new-to-the world scheme (The World Bank, 2010a). Form the point view of the RI literature, the newly built scheme is similar to new business model (or new value chain), in which several actors participate in introducing the RI (Afuah and Bahram, 1995; de Vries, 2006; Gallouj, 2002; Leifer, et al., 2000; Windrum and García-Goñi, 2008). In the new business model built, commercial banks fill their traditional
position, introducing the product of vehicle replacement finance. According to the notion of the hypercube of innovation introduced by Afuah and Bahram (1995) this innovation has different faces as it is considered as radical for some positions within the business model, while it is considered as incremental for other positions within the same business model. Thus, the NPVR is not considered as RI in the red zone, which is more akin to what Partanen et al. (2011) call systematic RI, which has a destroying impact on the whole infrastructure. Figure 1.1 depicts the new business model built.

**Figure 1.1: The Business Model (Scheme) of the Radical Innovation Investigated**

![Diagram](image)

*Source: Adapted from MOF (2010a: 26).*

The outcome of the NPVR is the previous business model (value chain, or replicable commercial mechanism). This business model includes several new positions: one new-to-the world (the Managing Entity); two new to Egypt (the advertising agency and a recycling firm). In this new business model, banks play two roles: (1) introducing the product of vehicle replacement finance intended to satisfy the unmet needs of underbankable segment (which is considered as incremental innovation); and (2) participating in the board of directors of the Managing Entity (which is considered as new-to-the world position). Most importantly, the roles played by banks before the acceleration phase. While the raw idea of vehicle replacement was initially generated by a public agency, several national and international banks (with the cooperation of relevant partners) had led the incubation phase (e.g., creating the concept, and building and finalizing the business model). Banks have also continued to play key roles after
transiting and implementing the innovation. They have continued (as members within the board of directors of the Managing Entity) to incrementally improve the replacement scheme. Thus, all the roles have been played by these national and international banks are investigated, from which the capabilities of RI management (LII) are concluded.

1.9 Thesis Structure

The study has eleven chapters that proceed as shown in Figure 1.2. Chapter 2 overviews the research context in which the empirical study will be undertaken. The nature of the Egyptian economy will be briefly disused. Following this is an overview of the financial services industry in general, and the banking sector in particular. A justification for why the banking sector is taken as the field of study will be presented. Moreover, the context of the National Program for Vehicle Replacement (NPVR) will be discussed in details by presenting: the baseline context; vehicle replacement; and the impact of the NPVR on the baseline context.

Chapters 3, 4, and 5 explore the relevant literature to connect this study with existing theory and prior research. Chapter 3 presents and discusses two critical aspects of any innovation study: innovation approaches; and innovation typologies. Chapter 4 presents a critical literature review. It includes two main sections: drivers of service innovation; and success/performance assessment. At the start of each section, several theories and concepts are discussed. Following this is conducting a systematic literature review to identify the gaps and deficiencies that the current research project is intended to fill in. Chapter 5 seeks to suggest an analytical, multilayer conceptual framework that addresses the three layers of research questions (LI, LII, and LIII).

Chapter 6 presents a detailed discussion and justification for the methodology employed when conducting the current research project. More specifically, this chapter discusses and justifies the following: the research paradigm adopted; the research approach; the research strategy employed; the choice; the time horizon; the data collection techniques and data analysis procedures; and the several tactics implemented to satisfy the four rigor criteria of research design. The chapter concludes with a list of the obstacles confronted when undertaking the field study.
Chapters 7-10 present and discuss the key findings of the empirical investigation. Chapters 7-9 present and discuss the key findings related to LI, LII, and LIII, respectively. In Chapter 10, the research propositions linking the constructs will be developed. Chapter 11 concludes the thesis by re-examining the achievement of the central research objective, summarizing the stages of research development, providing a brief synthesis of the key findings of the research, and outlining the key contribution to knowledge. The research limitations and suggestions for future research directions are also included.
Chapter 2 The Research Context

Chapter 2 overviews the research context in which the empirical study will be undertaken. It includes four sections. In section one, key data about Egypt will be provided, and the nature of the Egyptian economy will be briefly disused. In section two, the banking sector will be overviewed. Furthermore, the rationale and justification for choosing the banking sector will be presented. In section three, the context of the National Program for Vehicle Replacement (NPVR) will be presented. The baseline context of transportation and pollution will be presented. Following this is a snapshot of the NPVR. The following is the impact of the NPVR on the baseline context (the benefits). In section four, a summary of the chapter will provided.

2.1 Egypt

Egypt (officially the Arab Republic of Egypt) is a country located in North Africa, with some parts in Southwest Asia. It is divided into 27 governorates (IDSC, 2010). Some key data for Egypt is shown in table 2.1.

<table>
<thead>
<tr>
<th>Table 2.1: Key Data for Egypt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (million)</strong></td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>74.2</td>
</tr>
<tr>
<td>75.6</td>
</tr>
<tr>
<td>77</td>
</tr>
<tr>
<td>78.3</td>
</tr>
<tr>
<td>79.7</td>
</tr>
<tr>
<td><strong>Life expectancy at birth (years)</strong></td>
</tr>
<tr>
<td><strong>GDP (EGP billion)</strong></td>
</tr>
<tr>
<td><strong>GDP (USD billion)</strong></td>
</tr>
<tr>
<td><strong>GDP growth (annual %)</strong></td>
</tr>
<tr>
<td><strong>Consumer price inflation (CPI %)</strong></td>
</tr>
<tr>
<td><strong>Exchange rate (average) EGP:1USD</strong></td>
</tr>
<tr>
<td><strong>Total unemployment (% of total labor force)</strong></td>
</tr>
</tbody>
</table>


* Average CPI = 10.4%. This percent will be used later in this chapter when developing a stylized owner spreadsheet model (please note that this inflation rate will be assumed to be constant value for all years in the future).

According to the Central Bank of Egypt (CBE), the Egyptian economy is described as emerging (CBE, 2010). It is one of the most diversified in the Middle East, with several sectors such as tourism, agriculture, industry, and services, contributing to the GDP. In 2008, Egypt was classified as one of the top countries in the world undertaking economic reforms. Furthermore, growth in Egypt has “picked up steadily since 2004, making it one of the Middle East fastest-growing economies” (IMF, 2008). However, despite the high levels of economic growth over the past few years, there is difficulty in creating new jobs, leading to high rates of unemployment and poverty, and living
conditions for the average Egyptian remain poor. Thus, Egypt is classified as a lower middle income country (The World Bank, 2010b; WHO, 2009a).

Cairo is the Capital of Egypt. The Greater Cairo Region (GCR) is made up of 3 governorates (Cairo; Giza, and Qaluibia), with a population of about 17 million, and around 2 million Arabs, foreigners, and Egyptians visit daily for medical care, tourism, and business (MOF, 2010a). (Please note that the population is expected to increase to more than 27 million by 2027 (The World Bank, 2010a: 5).) As such, the GCR is classified by Demographica (2011: 13) as the 11th largest urban megalopolis in the world.

2.2 The Egyptian Banking Sector

In the finance literature, financial institutions may be classified into: financial intermediaries; and financial non-intermediaries. The main difference between the two types is that the former plays the financial intermediation function, issuing and selling financial assets (certificates of deposit, insurance policies, and mutual fund shares) to collect money which is used in making loans and buying other financial securities, e.g., stocks and bonds (El-Badawy, 2010; Rose and Hudgins, 2008). The structure of the Egyptian financial institutions is shown in figure 2.1.

Figure 2.1: The Structure of the Egyptian Financial Institutions

While commercial banks are regulated by the CBE (the bankers’ bank), the other financial institutions are regulated by the Egyptian Financial Supervisory Authority (EFSA). By the end of 2010, the number of financial institutions working in Egypt has
reached 252 institutions: 39 commercial banks (CBE, 2010); 29 insurance companies (EFSA, 2010a: 6); 36 mutual funds; and 148 brokerage firms (EFSA, 2010b: 3).

2.2.1 The History of the Egyptian Banking Sector

It might be useful to shed some light on the historical evolution of the Egyptian banking sector. Four main phases may be identified in this regard: (1) pre-nationalization (before 1952); (2) nationalization and financial repression (1952-1974); (3) partial liberalization, or Open door policy (1974-1991); and (4) financial liberalization (after 1991).

The pre-nationalization phase

In the pre-nationalization phase (before the second Egyptian Revolution (1952)), the banking sector in Egypt was dominated by foreign and private banks. The first bank (bank A) was established in 1898. Despite the fact that this bank was totally owned by foreign capital (British), one of its main responsibilities was to play the role of central bank. The first bank to be owned by private Egyptian capital (bank C) was established in 1920 (after the first Egyptian revolution), and its main role was to support the Egyptian industries by providing industrial credit (Hassan, 2008; Mohieldin, 1995; Omran, 2003, 2007).

The nationalization and financial repression phase

In the nationalization and financial repression phase, the Egyptian government adopted a socialist and nationalist ideology. Thus, after the second Egyptian revolution (1952), the Egyptian government started a comprehensive wave of nationalization striking most of the economic sectors’ enterprises. Therefore, significant changes unfavorably affected the banking sector. The year 1960 witnessed the start of massive and successive waves of nationalization, which left the whole banking sector in Egypt consisting only of the Central Bank of Egypt (CBE), five commercial banks, and three specialized banks, all of which were fully owned by the government. Thus, prior to 1970, there was no single private, joint venture, or offshore bank in Egypt, and all the private and foreign banks had to join the governmental banks or to close down. It was claimed that this policy was necessary to safeguard the creation of a centrally planned economic system (Hassan, 2008; Mohieldin, 1995; Omran, 2003, 2007).
The partial liberalization phase (Open door policy)

In the partial liberalization phase, the Egyptian government adopted an open-door policy (Infitah). The open-door policy of 1974 was essential to meet the need of comprehensive finance, mainly to reconstruct the immense damage caused by two previous wars. This policy also reflected the realization that improving the efficiency and competitiveness of the banking sector was essential to mobilize private and foreign resources needed to fuel further development. Thus, several investment laws had been issued to abolish entry barriers previously imposed on bank ownership, and several private, joint venture, foreign, and offshore banks had been established (Hassan, 2008; Mohieldin, 1995; Omran, 2003, 2007).

The financial liberalization phase

In the financial liberalization phase, the Egyptian government started a comprehensive economic reform and structural adjustment program to create a decentralized market where private and foreign entities have been encouraged by a free, competitive, and stable environment with autonomy from the government intervention. Thus, the private sector has been allowed to participate in the ownership of state-owned banks, and the public sector shares in 23 joint venture banks have been sold to private sector. Also, the government has allowed foreign capital to own more than 49% of the ownership of joint venture banks. In this respect, the liberal policies towards foreign bank involvement were among the factors that strengthened the banking sector in a short time, especially that the state-owned banks were characterized by poor corporate governance and inefficiency in allocating resources, and were overstaffed with unqualified personnel and mismanagement. In this context, the empirical results show that banks with larger foreign ownership involvement were associated with higher efficiency. Despite this phase of liberalization, reforming the banking sector has been slowly or cautiously implemented to prevent any economic or financial crises in post liberalization phases observed in many emerging economies (Hassan, 2008; Mohieldin, 1995; Omran, 2003, 2007).

2.2.2 The Structure of the Egyptian Banking Sector

Commercial banks are the dominant financial institutions in Egypt, as they control most of the financial flows and possess most of the financial assets. Although the comprehensive economic reform program, started in the early 1990s, has directed more
bank ownership and activity towards the private sector, “there remains lingering concern that achievements did not meet all expectations”. This is represented by the high concentration and market power of the public banks (Bolbol et al., 2005: 181; EIU, 2006). Table 2.2 presents the structure of the Egyptian banking sector.

### Table 2.2: The Structure of the Egyptian Banking Sector

<table>
<thead>
<tr>
<th>Ownership</th>
<th>No. of Banks</th>
<th>Branches* No.</th>
<th>Branches* %</th>
<th>Market Share</th>
<th>No.</th>
<th>%</th>
<th>Assets</th>
<th>Deposits</th>
<th>Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Sector Banks</td>
<td>5</td>
<td>2,080</td>
<td>59.4</td>
<td></td>
<td>57%</td>
<td>70%</td>
<td>59%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private &amp; Joint Venture Banks</td>
<td>27</td>
<td>1,329</td>
<td>38</td>
<td></td>
<td>43%</td>
<td>30%</td>
<td>41%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-shore Banks</td>
<td>7</td>
<td>93</td>
<td>2.6</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total*</td>
<td>39</td>
<td>3,502</td>
<td>100</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from CBE (2010).  

* Excluding branches of Egyptian banks abroad, and the two banks not registered with the CBE.

The previous table shows that the five state-owned commercial banks dominate the sector, accounting for nearly 57 percent of total assets, and holding 70 percent of deposits and 59 percent of loans. It should be noted that the financial services industry in Egypt is still promising, and the Egyptian banking sector is presently undergoing several changes. For example, although the corporate banking is characterized as being well established business, and its financial products and services are widely adopted by corporations, it has not met the sales target. The corporate demand for bank loans is greatly restricted because the banking concept at the retail and small and medium size enterprises (SMEs) levels is not well established in Egypt. At early 2000s, most banks have begun targeting retail banking as a new business thus offering products, such as consumer loans and retail banking activities. Thus, the retail banking business has grown substantially in recent years, without reaching its full potential (Bolbol, et al., 2005; EIU, 2006; Omran, 2003). However, according to the Egyptian Banking Institute (EBI), the SMEs business, a major link between corporations and consumers, is still slowly growing, being far away from its potential (EBI, 2011, May 3).

Two main reasons may explain the lack of the banking concept at the retail and SMEs levels: the limited innovation; and the lack of absorptive capacity of markets. First, the domination of Egyptian public banks in a highly concentrated market resulted in a frail competition and limited innovation (Bolbol, et al., 2005; Hassan, 2008; Mohieldin, 1995; Omran, 2003). Second, the slow absorptive capacity of the retail and SMEs markets may be due to the slow accumulation of required competences by these

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customers (taking into consideration the relatively complex nature of financial products, requiring technical product information on the part of the customers (Lovelock and Wirtz, 2007; Menon and O’Connor, 2007: 158)), and also due to culture values. For example, Kamel and Hassan (2003) states that the customer resistance has been intense with the sector being dominated by the cash society values, reluctant to, even, go to the bank and open an account for purely culture reasons, opting to keep their cash at home. Furthermore, according to the Ministry of Finance (MOF), “Egyptians are normally afraid to incur debt” (MOF, 2009a). Also, according to the Egyptian Banking Institute (EBI), Most of the Small enterprises (and the Micro borrowers), suffer from the following: (1) inability to secure loans that cover their needs of capital investment; (2) seen as lacking the creditworthiness; and (3) required to pay high interest rate (EBI, 2011, May 3). Moreover, two managers noted that:

<table>
<thead>
<tr>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>In one visit to some SMEs customers in a rural region, I saw myself large house rooms being used solely as strongbox and filled with money. . . . The banking concept is not well-established in Egypt, and this money is out of the banking cycle. (G, Mid1)</td>
</tr>
<tr>
<td>The investment opportunities in the SMEs sector are low compared with our great financial resources. . . . We face two main challenges: a large portion of this segment lacks the banking concept. And, many of the small businesses are classified as informal sector. Even, they do not have a Commercial Register. They are un-bankable. (A; Sen2)*</td>
</tr>
</tbody>
</table>

* Please note that Appendix A.3 shows the interview descriptive coding.

### 2.2.3 Financial Products and Services

As mentioned previously, commercial banks are the dominant financial institutions in Egypt. Many of these financial institutions are corporations that have broadened their financial services to implement the concept of universal (or comprehensive) banking. This concept allows these financial institutions to cross-sell their financial products and services, on the one hand, and also allows customers to enjoy the option of one-stop financial service shopping, on the other hand. (Please see quote 7/3) While broadening the range of their financial services, some institutions have followed the path of internal growth, while others have carried out mergers and acquisitions. Figure 2.2 illustrates one type of these comprehensive financial institutions.
Based on the Websites and brochures of several Egyptian commercial banks, many of these banks have several lines of business, like corporate banking, SMEs banking, retail banking, and investment banking. As such, these banks introduce comprehensive financial products and services. Examples are: (1) electronic banking services (e.g., corporate and consumer online banking, Phone Plus, and cash acceptance); (2) accounts and savings (e.g., business accounts, daily account, global account, current and saving accounts, time deposits, certificates of deposit, and family fund); (3) cards (e.g., business cards, consumer credit and debit cards, and prepaid cards); (4) loan products/services (e.g., corporate loans, savings loans, winning loans, cash loans, auto loans, and microfinance); (5) Bancassurance (e.g., investment plus, education investment plan, wedding investment plan, retirement investment plan, and shield programs); (6) investment products and services (e.g., open- and closed-end mutual funds, custodial services; feasibility studies and projects evaluation; financial consultancy; investment following-up; and managing security portfolios); (7) remittance services (e.g., foreign exchange transfers); (8) electronic payroll service; and (9) off-balance sheet activities (e.g., loan commitments, financial and commercial letters of
credit, foreign exchange contracts, interest rate swaps, and futures and options contracts).

2.2.4 Rationale and Justification for Choosing the Banking Sector
The banking sector has been chosen as the field of empirical investigation for several reasons. First, the financial services industry, through its products/services, provides important functions that influence resource allocation and economic growth (Levine, 2005; Naceur and Ghazouani, 2007). Second, through its adoption of information technology (IT), the financial services industry is described as one “vanguard sector”, leading the “service revolution” (Barras, 1990: 215). Third, the Egyptian banking sector is one leading sector in terms of the contribution of services industries to the GDP. In the mid-2000, while the several Egyptian services industries accounted for 48.9 percent of the GDP (Central Intelligence Agency, 2009), the financial services accounted for 7.8 percent (EIU, 2006), nearly 16 percent of the services’ contribution to the GDP. Fourth, as shown in the knowledge gap discussed in Chapter 1, there is a lack of longitudinal research seeking to investigate the radical innovation related capabilities and competences within the context of the financial services industries, in general, and the Egyptian financial services industry, in particular. In short, investigating the innovation related capabilities and competences will have important implications, not only for such critical economic sector, but also for the Egyptian economy in general.

2.3 The Context of the NPVR
This section includes four subsections. In the first subsection, I will present the baseline context giving rise to the National Program for Vehicle Replacement (NPVR). Thus, several contextual variables related to transportation and pollution will be discussed. There will be an emphasis on the GCR in which the first phases of the NPVR have been taken place. In the second subsection, several aspects related to many national replacement programs implemented in other countries will be mentioned. Then, a snapshot of the NPVR will be presented. Thus, several key aspects of the program will be discussed (e.g., the eligibility rules and criteria, the layers of financial incentives, the Clean Development Mechanism (CDM) component, the process map of replacement, and the concept of one-stop shop). In the third subsection, a stylized owner spreadsheet model will be developed to examine the replacement problem of a profit-maximizing
vehicle owner. In the fourth subsection, the effect of the NPVR on the baseline context will be mentioned. The benefits of the NPVR on the national and international levels will be listed. The relevant literature will be reviewed during this section.

2.3.1 Transportation and Pollution (The Baseline Context)

The transport sector worldwide contributes significantly to the emission of global GHGs, resulting in a rise in global temperature and climate change. For example, the transport sector counted for 24% of the world-wide production of CO₂ in 2003. Thus, the transport sector is a major source of climate problem and will increase its relative contribution dramatically in the forthcoming decades, due to the rapid increase in population, expansion of middle class in developing countries, and the availability of cheaper vehicles. Currently, the OECD countries count for about 78% of transport induced GHG. This percentage, however, is expected to drop in the forthcoming decades, and the dynamically developing countries and the countries, which are presently at the threshold to industrialization (China, India, Latin America, and South Africa), will be the main accelerator for the problem (Hensher, 2008; Rothengatter, 2010). In other words, developing countries will play a central role in the low-carbon economy of the future (Santos, Behrendt, and Teytelboym, 2010). Egypt is one of these developing countries. For example, the Egyptian transportation sector was responsible for more than 40 million metric tons of GHG emissions, most of which was emitted by road based vehicles. About 40 percent of national transport emissions, or 14 million tons of CO₂-equivalent, may be attributed to the GCR alone, where nearly half of all motorized vehicles in Egypt operate (The World Bank, 2010a). It is important, thus, to overview the setting of the transportation and pollution in Egypt by discussing several characteristics relevant to the NPVR. Table 2.3 lists some important characteristics of the transportation system in Egypt and the GCR.
Egypt

Dramatic increase in total vehicle registration and its effect on fuel consumption. Egypt has seen a dramatic increase in total vehicle registration, especially after introducing the auto and personal loan products by many commercial banks. From 1993 to 2005, licensed vehicles had increased from 2m to 3.385m, nearly 70% increase in 13-year period. As such, the transport sector is identified as the main consumer of oil products in Egypt, accounting for nearly 38 percent. Table 2.4 represents the number of licensed vehicles in Egypt until June 2005.

High number of old vehicles. In June 2005, old vehicles (15 years or older) represented 56.37% of the total vehicles registered in Egypt (as shown in table 2.4).

Heavily subsidized fuel and poorly targeted use of public funds. Fuel was heavily subsidized. For example, while the pump price of Gasoline 90 was EGP 1.3 per liter, the subsidy was around EGP 2.5 per liter. As many of the beneficiaries were the relatively wealthy owners of private cars, such blanket subsidies represented a poorly targeted use of public funds.

GCR

Heavily congested traffic and lost productivity. In June 2005, the number of licensed vehicles in the GCR represented nearly 44% of the total licensed vehicles in Egypt (1.485m out of 3.385m). As such, the traffic in the GCR is heavily congested for much of the day, especially during Mondays to Thursdays. For example, one study showed that the average city-centre speeds were of the order of 11 km/h resulting in a very high commute time to and from work. Such aggrivated traffic congestion would result in billions of Egyptian pounds in lost productivity and other economic costs, leading to losses in GDP. Table 2.5 represents the number of licensed vehicles in the GCR until June 2005.

Chaotic and undisciplined traffic and its effect on public safety. Traffic in the GCR was described as chaotic and undisciplined. For example, facilities for pedestrians are poor and pedestrians mix freely with traffic (photo 2.1). This had a severe impact on the public safety due to the high road fatality rates. At least 1,000 residents die each year in motor vehicle accidents, more than half of them pedestrians, and over 4,000 are injured.

High number of old vehicles. In June 2005, old vehicles (15 years or older) represented 68.24% of the total vehicles registered in Egypt (as shown in table 2.5).

Serious effects of transportation on air and noise pollution. Egypt is vulnerable to the potential effects of global climate change such as rising sea levels, falling crop yields, and changing the patterns of rainfall in the Nile Basin. With about 1.485m vehicles on the streets in 2005, mobile emissions were one of the major sources of air pollution in the GCR. Vehicle emissions of fine particulate matter and other pollutants were significant. The studies conducted by the Egyptian Environmental Affairs Agency (EEAA), the executive arm of the Ministry of Environment (MOE), indicated that vehicle emissions in the GCR contributed 50% of total nitrogen oxides (NOx), more than 90% of total carbon monoxide (CO), and 26% of the total pollution from the suspended particular matter PM 10 (particles with aerodynamic diameters of up to 10 microns). Concentrations of carbon monoxide were found to exceed the limits of Law 4/1994 in heavy traffic areas, particularly during traffic congestion. PM10 presented the most critical air quality problem in Egypt, primarily due to high background values resulting from dust blown from the desert. The unique topology of the GCR also exacerbates the pollution problem with what is known as the Black Cloud occurrence, or the Greenhouse Layer Effect, during which high concentrations of pollutants are trapped in the air. This phenomenon is shown in photos 2.2 and 2.3. In short, the air quality in the GCR is far from satisfactory. Furthermore, the aging fleet of vehicles, especially buses, microbuses, and taxies, causes noise pollution**.


* All the photos are shown in Appendix A.1.

Table 2.3: Characteristics of the Transportation System in Egypt and GCR

<table>
<thead>
<tr>
<th>Type</th>
<th>Manufacturing year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>185,493</td>
</tr>
<tr>
<td>Taxi</td>
<td>33,911</td>
</tr>
<tr>
<td>Microbus</td>
<td>18,083</td>
</tr>
<tr>
<td>Heavy trucks</td>
<td>58,547</td>
</tr>
<tr>
<td>Bus</td>
<td>31,116</td>
</tr>
<tr>
<td>Total</td>
<td>327,150</td>
</tr>
</tbody>
</table>

Percent

| >15yrs = 56.37% | 43.63% | 100% |
| >25yrs = 27.78% | 72.22% |
| >35yrs = 9.75%  | 90.25% |

Table 2.4: The Number of Licensed Vehicles, Egypt, 30/06/2005

Source: Adapted from EEAA (2008d: 1).


* All the photos are shown in Appendix A.1.

Table 2.3: Characteristics of the Transportation System in Egypt and GCR

<table>
<thead>
<tr>
<th>Type</th>
<th>Manufacturing year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>185,493</td>
</tr>
<tr>
<td>Taxi</td>
<td>33,911</td>
</tr>
<tr>
<td>Microbus</td>
<td>18,083</td>
</tr>
<tr>
<td>Heavy trucks</td>
<td>58,547</td>
</tr>
<tr>
<td>Bus</td>
<td>31,116</td>
</tr>
<tr>
<td>Total</td>
<td>327,150</td>
</tr>
</tbody>
</table>

Percent

| >15yrs = 56.37% | 43.63% | 100% |
| >25yrs = 27.78% | 72.22% |
| >35yrs = 9.75%  | 90.25% |

Table 2.4: The Number of Licensed Vehicles, Egypt, 30/06/2005

Source: Adapted from EEAA (2008d: 1).
Table 2.5: The Number of Licensed Vehicles, GCR, 30/06/2005

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>114,082</td>
<td>185,054</td>
<td>265,407</td>
<td>406,726</td>
<td>971,269</td>
<td>65.39%</td>
</tr>
<tr>
<td>Taxi</td>
<td>23,474</td>
<td>17,097</td>
<td>21,587</td>
<td>22,752</td>
<td>84,910</td>
<td>5.72%</td>
</tr>
<tr>
<td>Microbus</td>
<td>7,658</td>
<td>5,456</td>
<td>6,042</td>
<td>10,153</td>
<td>29,309</td>
<td>1.97%</td>
</tr>
<tr>
<td>Heavy trucks</td>
<td>13,004</td>
<td>31,085</td>
<td>106,896</td>
<td>23,326</td>
<td>174,311</td>
<td>11.74%</td>
</tr>
<tr>
<td>Bus</td>
<td>28,044</td>
<td>76,207</td>
<td>112,426</td>
<td>8,839</td>
<td>225,516</td>
<td>15.18%</td>
</tr>
<tr>
<td>Total</td>
<td>186,262</td>
<td>314,899</td>
<td>512,358</td>
<td>471,796</td>
<td>1,485,315</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Adapted from EEAA (2008d: 1).

Table 2.4 shows that vehicles ≥15yrs represented 56.37%, vehicles ≥25yrs represented 27.78%, while vehicles ≥35yrs represented 9.75% of the total vehicles registered in Egypt. Table 2.5 shows that the number of licensed vehicles in the GCR was 1.485m, representing nearly 44% of the total licensed vehicles in Egypt. It also shows that vehicles ≥15 years represented nearly 68.24%, vehicles ≥25yrs represented 33.74%, while vehicles ≥35yrs represented 12.54% of the total vehicles registered in the GCR. The previous three tables show that the transportation system in Egypt differs, to some extent, from the transportation systems in other (developing) countries. On the other hand, as the first phases of the NPVR have concerned the aging fleet of taxis and microbuses in the GCR, it is important to overview the setting of these two types of private transport services. Table 2.6 presents the percent of old taxis and microbuses in Egypt and the GCR. Table 2.7 lists some of the main characteristics of operations of taxis and microbuses in the GCR.

Table 2.6: Old Taxis and Microbuses in Egypt and the GCR (≥15 Years)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Egypt old taxis (from all registered taxis in Egypt)</td>
<td>68.70</td>
<td></td>
</tr>
<tr>
<td>Percent of Egypt old microbuses (from all registered microbuses in Egypt)</td>
<td>51.50%</td>
<td></td>
</tr>
<tr>
<td>Percent of GCR old taxis (from all registered taxis in GCR)</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Percent of GCR old microbuses (from all registered microbuses in GCR)</td>
<td>65%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Self.

The previous table shows that taxi vehicles ≥15yrs represented 73% from all taxi vehicles registered in the GCR, microbuses ≥15yrs represented 65% from all microbuses registered in the GCR.
Table 2.7: Taxies and Microbuses in the GCR (Characteristics of Operations)

**Ownership structure.** Four points related to the ownership structure are relevant. First, most taxis are owned by the individual driver and there appear to be few instances of drivers sharing a vehicle. Driver owned taxis can be identified on the street as black and white (B&W) vehicles. Microbuses are also predominantly owned and operated by a single driver. There are also the so-called yellow cabs, which are owned by private companies established in early 2006. Originally, three companies signed an agreement with the Governorate of Cairo to provide taxis services, but only two companies remain. They use only new models from 2006 and employ drivers on shifts. Their operation differs from that of the regular taxis in various ways, e.g., cabs are fitted with meters and it is understood that these are used by the drivers and verified by the taxi companies*. An example of a yellow cab is shown in photos 2.4 and 2.5. Second, in order to work as a taxi driver, a person must be at least 21 years old, hold a driving license, be in good health, carry insurance, and have no criminal record. This status must be proven and renewed every three years. Third, vehicles must be licensed by the Traffic Department, one department of the Ministry of Interior (MOI), and the number of taxis and microbuses licenses available to individual owners was capped in April, 2006 due the accumulation of vehicles in the GCR. Only yellow Taxicab companies have been allowed to be issued new taxi license plates. Fourth, there is an association of vehicle drivers for all types of vehicle (not just taxis), but it is understood that this does little more than collecting social insurance on an annual basis to provide pensions for drivers after retirement. There is no formal association of taxi drivers.

**Areas of Operation and Routes.** Taxis registered in Cairo, Giza and Qaluibia Governorates are free to operate throughout the GCR. They can pick up passengers in any governorate and travel between governorates. However, they require permission from the Traffic Department to take passengers outside the GCR. B&W taxis are waved down on the street***. Microbuses, on the other hand, operate on fixed routes that are determined by each Governorate. Routes are supposedly fixed according to demand but the procedure appears to be somewhat flexible.

**High number of taxies and microbuses in highly congested areas.** The number of taxis and microbuses is noticeably high in the traffic composition on city centre streets in a way that aggravate the traffic congestion.

**Very poor technical conditions, low level of safety, and high level of pollution of old vehicles.** Typical models of taxis are 1300cc to 1600cc petrol fuelled saloon cars assembled in Egypt or imported from abroad either new or second hand (although it is no longer possible to import used cars). The older models include: Fiat 128 and 131 (photo 2.6); and Peugeot 504. On the other hand, typical microbus models are diesel fuelled Toyota Hiaces imported used from Japan (photo 2.7). However, it is understood that there are also locally assembled models. The technical condition of most old vehicles is generally very poor as they have been repeatedly patched and repaired. It is common for the bodywork to be badly damaged, for lights to be inoperative, and for door handles to be missing (photo 2.8). Also, based on a survey of 300 drivers and also based on observation carried out by the EEAA, most of the drivers mentioned that their vehicles might breakdown more frequently, were cheap to repair, and were often repaired in a somewhat makeshift way beside the street (photo 2.9). For taxis such as the Fiat 128, simple spare parts may be manufactured locally or improvised from other materials at very low cost. In this respect, older taxis breakdown frequently and block the traffic. It is said that one taxi vehicle breaks down every 10 minutes on 6 October Bridge, one of the main traffic arteries across the river, blocking traffic (photo 2.10). Furthermore, the safety of such vehicles must be highly questionable. Finally, vehicles, with such very poor technical conditions, cause considerable pollution, and as such, do not meet the modern limits of emission standards.

**Noncompliance.** Three points are of particular importance. First, in principal, taxi drivers are not permitted to pick up passengers if they already have passengers on board. In reality, however, they are observed doing so. Second, taxis are fitted with meters that are checked and calibrated annually (photo 2.11). However, in reality, the meters are universally not used***. Instead, trips are charged roughly according to distance, and possibly according to time if they are required to wait for passengers. Actual fares charged are some five times the official rate. Third, taxi drivers do not pay income tax.

**No single body responsible for regulating the taxi operations.** One of the major issues relating to the regulation of taxis in the GCR was that responsibility was split between many different ministries and other bodies, including for example: the governorates of Cairo, Giza, and Qaluibia (taxi fares, microbus route licensing); the Traffic Department and Traffic Police (taxi permits, vehicle licensing, emissions testing, enforcement of regulations); the Ministries of Petroleum and Finance (subsidies); and the Ministry of Environment (regulations and standards to protect the environment).


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* Please note that the majority of taxi and microbus vehicles are owned by individuals. For example, out of the 84,910 taxi vehicles registered in the GCR, there are 84,170 taxi vehicles owned by individuals (Kfw-Entwicklungsbank, 2008), representing 99.1%.

** It is understood that the majority of taxi market in Egypt has characteristics that are different from the taxi markets in many countries (e.g., the existence of ranks, telephone bookings, and radio control circuits (Gwilliam, 2008)).

*** Please note that weak driver discipline in many countries is observed (Gakenheimer, 1999).
Transportation systems in Egypt and other (developing) countries

A brief comparison between the transportation system in Egypt and other (developing) countries might be interesting. *Dramatic increase in total vehicle registration*: the rapid pace of motorization characterizes much of the developing world. However, the annual increase in Egypt averages nearly 6%, which is much lower than other developing countries, averaging more than 15% annually (Gakenheimer, 1999). *Congestion and declining mobility*: most of the large cities of the developing world are highly congested. For example, while the average weekday rush hour traffic speeds in Egypt was 11 km/hour or less, it was 10 km/hour or less in Manila, Bangkok, Mexico City, and Shanghai, and was 15 km/hour or less in Kuala Lumpur and Sao Paolo. Thus, the rapid pace of motorization combined with the inability of transportation facility capacity and urban structure adjustment to keep up (due to the limited public budget) lead to enormous congestion, or what is known as premature congestion, occurring at relatively low level of motorization (Gakenheimer, 1999; Santos, Behrendt, and Teytelboym, 2010).

*High number of old vehicle*: percent of Egypt old vehicles (≥15yrs) represented 56.37% from all registered vehicles in Egypt. This percent was very high if compared to the percent of old vehicles in other countries (e.g., vehicles ≥15yrs represent 14% in the USA (Kim et al, 2004)). *Road traffic fatality*: the problem of road traffic fatality and injuries is acute in developing countries. Over 90 percent of road-related deaths occur in low- and middle-income countries, even though these countries have just 48 percent of the world’s registered vehicles. However, the average number of road traffic fatalities in Egypt is extremely high. For example, while the road traffic death rate per 100,000 population is 41.6 in Egypt, it is 10.3, 19.5, 21.5 fatalities per 100,000 population in high-income countries, middle-income countries, and low-income countries respectively (WHO, 2009b). In this respect, “the aging fleet is a contributing factor to Egypt’s high road fatality rates” (The World Bank, 2010a: 4).

*Local air pollution and public health*: local air pollution from transport in developing countries contributes to the premature deaths of over 500,000 people per year. Also, excesses of fine particulate matter are wide-spread and large. For example, PM10 is linked to numerous adverse health effects, including increased hospital admissions and emergency room visits, respiratory symptoms, exacerbation of chronic respiratory and cardiovascular diseases, decreased lung function, and premature mortality.
Chapter 2 The Research Context

(Gakenheimer, 1999; Santos, Behrendt, Maconi, *et al.*, 2010; Santos, Behrendt, and Teytelboym, 2010). Please note that the emissions of public transport vehicles are significantly greater than private vehicles. For example, the emissions of a taxi are 9.5 times of that from a similar private car in Beijing because of the taxi’s higher annual mileage which averages 4.5 times the miles driven by a private car, and because of the higher deterioration rate of emission controls (Hao *et al.*, 2006).

**Controlling the environmental impact of transport**

The literature shows that several economic and regulatory instruments could be used to control the environmental impact of transport, and to create a sustainable road transport model. Examples are: fuel taxes (including differential taxes between different types of vehicles); emissions taxes; the introduction of cleaner fuels; the implementation of enhanced inspection and maintenance; accelerated retirement of older vehicles (replacement); parking charges; emission level regulation (e.g., tighten the pollution standards); traffic calming; vehicle use restriction; vehicle noise and safety regulation (Acutt and Dodgson, 1997; Bae *et al.*, 2011; Johnstone and Karousakis, 1999; Kathuria, 2002; Santos, Behrendt, Maconi, *et al.*, 2010; Zachariadis *et al.*, 2001).

Through the coordination and cooperation among several national and international bodies, two complementary pilot projects had been initiated to control the emissions of in-use vehicles: one related to improving vehicle inspection; and the other related to encouraging the use of the compressed Natural Gas (CNG) as a low cost, more efficient, environmentally clean fuel (retrofit program). (Please note that the use of natural gas vehicles has proved to be more efficient in many transportation systems (Hackney and de Neufville, 2001; Hao, *et al.*, 2006; Santos, Behrendt, Maconi, *et al.*, 2010; Szwarcfiter *et al.*, 2005; Yedla and Shrestha, 2003).) The main goal of these pilot projects was to develop effective mechanisms that would be gradually replicated in the rest of the Egyptian governorates, starting by the GCR (EEAA, 2008a, 2008c; Kfw-Entwicklungsbank, 2008). Table 2.8 overviews these two projects and lists the main obstacles confronted. Of particular importance are the obstacles as they reveal part of the context that the NPVR intended to tackle.
Chapter 2 The Research Context

Table 2.8: Two Failed Pilot Projects in the GCR

<table>
<thead>
<tr>
<th>Pilot Projects</th>
<th>Obstacles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle exhausts examination</strong>&lt;br&gt;<em>In Traffic Units.</em> In 2003, the first mechanism was implemented. The United States Agency for International Development (USAID) delivered the traffic departments in Giza and Qalyubia governorates 38 mobile devices for vehicle emission testing (VET), in addition to training those who were designated to the technical inspection of vehicles. In addition, the MOI issued decree to link between the issuance of vehicle license and its emission testing. This decree was essential for the reinforcement of Law No. 4 for 1994 on the protection of environment. Owners of private cars must have their vehicles tested every three years and of taxis every year. Failure to pass an emission test results in the non-renewal of the vehicle license. In July 2004, the VET mechanism was also extended to include the Cairo governorate. Another 22 mobile devices were added to 22 traffic units. <em>On the Road.</em> In 2004, the first VET mechanism was extended to include random tests carried out at the roadside in Cairo by both the environmental and traffic police. Any vehicle failing a test was supposed to remedy the problem by one of the specialized centers. After this, the proportion of the exhaust must be re-measured to ensure the compliance with the law before the vehicle being allowed to be on the road again. The results of on the road examination showed that, on average, 28% of cars examined each year did not pass the emission test. The result of on the road testing is more realistic than in the traffic unit, as many of the vehicle owners were accustomed to remedy their vehicles before the date of license renewal.</td>
<td>There were deficiencies in the application process due to five main reasons. The first was the repeated malfunctions of the measurement equipments as a result of the sensitivity of the exhaust equipments and lack of experience of some workers in the traffic units about the sound ways of operations and preventive maintenance of these equipments. The second was the lack of spare parts of these equipments. The third was the continuous increase in the number of cars licensed coinciding with the limited capacity of some traffic units due to the limited personnel, equipment and space assigned for the screening process. The fourth was the lack of specialized centers responsible for diagnosing and repairing the environmentally related problems for the vehicles failing the VET. The fifth was the relative ease for the system to be bypassed (noncompliance).</td>
</tr>
<tr>
<td><strong>Encouraging the use of CNG as environmentally clean fuel</strong>&lt;br&gt;Before 2002, there were only two companies providing the CNG services in Egypt. To stimulate the rate of CNG market development, the General Authority for Investment (GAFI) with the support of the Ministry of Petroleum (MOP) granted a five-year tax holiday to each approved CNG company. In addition, another four companies had been established during the period from 2002 to 2006. By 2007, there were 117 CNG stations in Egypt, 63 of them located in the GCR. These six companies were also licensed to operate 61 conversion centers in Egypt, about half of them in the GCR. Also, an initiative was launched by the MOP to encourage the conversion of any vehicle to run on CNG (retrofitting program). This was done by providing a retrofit subsidy of EGP 500 towards the cost of conversion (thus, the cost of conversion would be 5000 EGY pounds instead of 5,500 EGY Pounds). Also, in 2004, Bank A, with the cooperation with of the MOP, developed a really new financial product to the Egyptian market: the product of financing the conversion of vehicles to be working by CNG instead of petrol (this financial product will be discussed in Chapter 7).</td>
<td>Only 20% of the pre-1980 manufactured taxis (8,100 taxis out of the 40,571 taxis) had been converted to CNG. The EEAA carried out a survey for the pre-1980 category of taxi owners and companies providing the conversion service to identify the reasons of such low participation rate although the conversion to CNG would produce substantial cost reduction for the vehicles’ owners. Three main reasons were identified. First, obsolesce and low economic value of these taxis did not encourage the taxi owners to participate on the gas conversion project. Second, the cost of conversion (EGP 5,000) was conceived by these taxi owners as high. Third, the natural gas companies providing the conversion service required that the efficiency of the vehicle motor should not be less than 75% to be eligible for gas conversion. In this context, most of the old vehicles did not meet this requirement.</td>
</tr>
</tbody>
</table>

The discussion of the setting has shown that the situation was *unsustainable* due to several complex issues (as shown in tables 2.3 and 2.6) and also due to a complex set of obstacles (as shown in table 2.7). It is concluded, thus, that the GCR relied on underdeveloped, overcrowded, and unreliable transport services, which had a severe impact on all economic activities. Also, the aging fleet of vehicles is a contributing factor to high road fatality rate, poor air quality and public health problems (Kfw-Entwicklungsbank, 2008; The World Bank, 2010a).

The EEAA conducted economic and environmental studies to recognize the opportunity of replacing the aging fleet of vehicles, starting by the aging fleet of taxis and microbuses. Following this was undertaking a third pilot project (the replacement of 1,000 old taxis), seeking to develop an effective commercial replacement mechanism that would be replicated latter. The results of the economic and environmental studies and of the third pilot project were very promising, and the EEAA suggested initiating a national program for vehicle replacement (EEAA, 2007a, 2008c).

### 2.3.2 Vehicle Replacement

Old vehicle replacement and scrappage programs (also known as voluntary accelerated vehicle retirement programs, vehicle buy-back, vehicle scrappage, or cash-for-clunkers) are popular, and have been implemented in many (mostly developed) countries such as Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Norway, Spain, UK, Japan, USA, China, India, and Brazil. These programs are designed to accelerate the removal of older, less efficient, less safe, and more polluting vehicles by new(er) models. These programs also seek to stimulate the national auto industry by boosting new vehicle purchases, and maintain a stable vehicle fleet at the same time. Some of these programs were confined to specific regions or cities, while others were nationwide (e.g., Aldred and Tepe, 2011; Dill, 2004; Hao, *et al.*, 2006; Kathuria, 2002; Kim, *et al.*, 2004; Lumbreras *et al.*, 2008; Santos, Behrendt, Maconi, *et al.*, 2010; Spitzley *et al.*, 2005; Szwarcfiter, *et al.*, 2005; Van Wee *et al.*, 2000; Zolnik, 2012). Table 2.9 summarizes the major aspects of several international vehicle replacement and scrappage programs while table 2.10 summarizes the major aspects of the NPVR.
Table 2.9: Major Aspects of Most Replacement and Scrappage Programs

<table>
<thead>
<tr>
<th>Eligibility criteria and rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Age-based limits. In almost all the replacement programs implemented up to present, the vehicle age has been taken as the main criterion for any vehicle to be eligible for scrappage. The main reason for using the age-based limit is that old models are high emitters (emitting pollutants at substantially greater rates than newer models)*. In addition, vehicle age is found to be negatively related to the vehicle’s survival probability**. Thus, several categories of age range are developed, and all vehicles of the same age range are treated in the same way (e.g., in terms of scrap value). The lowest minimum age used was 9 years (as in Germany, Italy, and the Netherlands), while the highest age used was 20 years (as in some programs in the USA);</td>
</tr>
<tr>
<td>- Vehicle condition-related variables also have been taken into consideration in many replacement programs. Thus, vehicles that do not reach the end of-life category, but failed proper inspections and maintenance tests made in, for example, the last 12 months are also included;</td>
</tr>
<tr>
<td>- Odometer reading also has been used as replacement criterion. For example, the Spanish program used &gt; 10 years or &gt; 250,000km as a replacement criterion.</td>
</tr>
<tr>
<td>- Being currently operated for, for example, the last 12 months, and evaluated to have, for example, three remaining years of useful life (because only vehicles in use are currently contributing to the GHG emissions);</td>
</tr>
<tr>
<td>- Being registered in the region/area identified for, for example, the past 12 months (to prevent importing vehicles solely for scrapping them, and also to insure the achievement of the emissions reduction target within the area);</td>
</tr>
<tr>
<td>- Being legally registered to the person scrapping the vehicle; and</td>
</tr>
<tr>
<td>- Accepting the program terms (e.g., the eligible replacement vehicles included in the replacement program, and the mandatory maintenance and emissions testing program).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most of the scrappage programs provide the owners of eligible vehicles a variety of different incentives to promote and accelerate the vehicle scrappage program, including***:</td>
</tr>
<tr>
<td>- An amount towards the purchase of a new or newer vehicle (“cash for clunkers”);</td>
</tr>
<tr>
<td>- An interest-free loan (up to €10,000 like in the Spanish program);</td>
</tr>
<tr>
<td>- Free transit pass for one or two years (as in scrappage only programs); and/or</td>
</tr>
<tr>
<td>- Tax reduction (or exemption).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scrapping and recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrapping must be verified to prohibit the resale and re-use of the retired vehicles or its polluting components (e.g., engine). Also, scrapped vehicles are classed as hazardous waste until they have been fully treated (recycled). Thus, the potential environmental impacts of retirement operations (e.g., dismantling, shredding, etc.) must be considered when examining the potential environmental benefits of scrappage (please note that around 75 percent of an end-of-life vehicle is a recyclable metals, and the rest of the vehicle is considered waste and generally goes to landfill, which is increasingly regarded as a problem).</td>
</tr>
</tbody>
</table>

Source: Compiled from Hahn (1995); Dill (2004); Kim, et al. (2004); Yamamoto, et al. (2004); Chen and Niemeier (2005); Spitzley, et al. (2005); Chen and Lin (2006); Smink (2007); ACEA (2009); Santos, Behrendt, Maconi, et al. (2010); Lorentziadis and Vournas (2011).

* Please note that vehicles from older model years have less sophisticated pollution-control equipment. Furthermore, emissions-control devices deteriorate over time (Alberini and Harrington, 1995; Dill, 2004; Zachariadis, et al., 2001). Thus older vehicle produce a disproportionate share of vehicle emissions. Kavalec and Setiawan (1997) state that ≥10 years old in the US accounted for 51% of hydrocarbon emissions while contributing less than 18% of vehicle miles travelled.

** One survival model estimates the following probabilities: 1.00 survival rate for 0-5 year vehicles; 0.80 survival rate for 10 year vehicles; 0.55 survival rate for 15 year vehicles; 0.30 survival rate for 20 year vehicles; and 0.15 survival rate for 25 year vehicles (Lin et al., 2008).

*** Please note that incentives have a high impact on the participation rate. For example, Yamamoto, et al. (2004) investigate the effect of grant for scrapping on household vehicle transaction. They find that the average holding duration becomes shorter by 3.3 years, when the grant for scrappage is available.
Table 2.10: Major Aspects of the NPVR

<table>
<thead>
<tr>
<th>Eligibility Rules and criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>All the eligibility criteria and rules mentioned above (except the second and third ones) have been implemented in the NPVR. The age-based limit used in the program is 20 years or older. According to the traffic law #121 (2008), owners of mass transport vehicles (taxis, microbuses, trailer trucks, and buses) greater than or equal to 20 years old in a given year must not receive new operating licenses or license renewals. The vehicle owners affected by this law (in the GCR) were given a time limit of 3 years (by the year 2011) to adjust their situation, and replace their vehicles with more recent, less polluting, and saver vehicles.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer of financial incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Most of the owners of the aging fleet of vehicles belong to the lowest income level, and have been characterized as lacking the ability to pay the capital investment for a replacement vehicle. Also, these owners are classified as under bankable segment, which does not meet the credit criteria of commercial banks, and thus could not be able to get finance with low interest rates.</td>
</tr>
<tr>
<td>-Thus, designing more promising layers of incentives were seen as an integral component to support the enforcement of Traffic Law #121, by ensuring that vehicles affected by the law are surrendered and scrapped, rather than being: (1) converted to private use, excluding them from the law; (2) sold to regions where the law does not apply*; and (3) dismantled and sold for use in other vehicles; or (4) converted to private use, and operated as taxi, with (or even without) the private license plates.</td>
</tr>
<tr>
<td>-The layers of incentives provided are:</td>
</tr>
<tr>
<td>-The managing entity (the program sponsor) offers EGP 5,000 as a scrap value, which is used as a down-payment for a new, eligible vehicle;</td>
</tr>
<tr>
<td>-The government exempts customs on imported components of the vehicle, and also pays the vehicle sales taxes on behalf of the vehicle owner;</td>
</tr>
<tr>
<td>-The participated Egyptian vehicle dealers offer their vehicles at discounted prices, and also provide about 40% discount on the prices of spare parts, in addition to the priority in accessing the service stations to perform the routine maintenance;</td>
</tr>
<tr>
<td>-The Ministry of Interior (MOI) offers a discount on the fees of licensing and registration;</td>
</tr>
<tr>
<td>-The participated banks (and insurance companies) offer loans (and comprehensive, all-risk insurance) with more favorable terms;</td>
</tr>
<tr>
<td>-An ad agency is contracted to pay a fixed monthly amount to the taxi owner in exchange for use of internal and external advertising space; and</td>
</tr>
<tr>
<td>-Gas companies are contracted to convert petrol vehicles to run on CNG, at a discounted price.</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Scrapping &amp; recycling (An obstacle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrapping and recycling represented a great challenge. Egypt had little experience of handling scrapped vehicles as old vehicles were repeatedly rebuilt and patched. Thus, the concept of vehicle lifetime did not really apply in this case. Furthermore, there were no specialized centers for vehicle recycling in Egypt. There were only random junk workshops that were unspecialized in the operations of vehicle recycling. In short, there was a lack of capability to insure that the scrapping and recycling operations were strict, and were undertaken in an environmentally sound manner.</td>
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<thead>
<tr>
<th>Supply of vehicles (An obstacle)</th>
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<tbody>
<tr>
<td>The locally assembled models are to be preferred by the Egyptian Government to support local industry, minimize costs, and reduce exposure to taxes (please note that the domestic production of automotive vehicles is limited to the assembling of vehicles, and the proportion of the local component in the auto industry increased from 40 percent to 45 percent in 2000). Although the capacity utilization is low at present, the supply of new vehicles might become an issue if a large number of vehicles are to be replaced in a short period of time. It would be necessary, therefore, to stratify the fleet replacement so that the number of vehicles that would be replaced each year would not exceed the available resources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A CDM project (Life span 28 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The major difference between other vehicle replacement programs and the NPVR is that clean development mechanism (CDM) is an integral component of the NPVR.</td>
</tr>
</tbody>
</table>

Source: Kfw-Entwicklungsbank (Kfw-Entwicklungsbank, 2008); Fenhann and Hinostrroza (March 2011); The World Bank (2010a); MOF (2010a); MSEA (2007); CDM.UNFCCC (2011).

* Please note that there is a popular second-hand market in Egypt, and the high prices in this market would weaken the scrappage subsidy.

In general, the CDM instrument has not been used extensively in the transport sector (Eiweida and Krambeck, 2010; Rothengatter, 2010). In fact, some programs did not achieve the emissions reduction target (Dill, 2004), while, unfortunately, other
programs have increased the emissions rather than reducing them as a shortening of the average lifetime will boost vehicle production, requiring energy for car materials and assembly, and producing emissions. Furthermore, many old vehicles are hardly used, especially the worst ones, and replaced by faster and bigger vehicles. “This may explain why the literature is not unanimous in its assessment of the benefits of scrappage schemes on emissions” (Kathuria, 2002; Santos, Behrendt, Maconi, et al., 2010; Van Wee, et al., 2000: 20). The emissions-reducing potential of scrappage schemes is stronger in highly polluted cities with large share of old vehicles (Santos, Behrendt, Maconi, et al., 2010). Furthermore, the NPVR is well recognized internationally as a successful experience in a developing city (CDM.UNFCCC, 2011; ESMAP, 2010; Krambeck, 2010; The World Bank, 2010a). Thus, it will be interesting to shed light on several aspects related to CDM transport projects. Table 2.11 discusses several major aspects of CDM transport-sector projects.
Table 2.11: Major Aspects of CDM Transport Projects

<table>
<thead>
<tr>
<th>Types of CDM transport projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>- CDM allows emission reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tone of CO2. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. The CDM has dual goals: (1) promoting sustainable development; and (2) reducing GHG emissions.</td>
</tr>
<tr>
<td>- There are three types of CDM projects: large scale projects; small scale projects; and Program of Activities (PoAs). Large scale projects can be used for projects of any size, while small scale projects are the ones that reduce &lt; 60,000 tons of CO2 equivalent per annum. The aim of PoAs is to broaden the CDM field to replicable projects (CDM Program Activities or CPAs) with low and physically spread GHG emissions reductions activities that would have been difficult and time-consuming to develop on a project-by-project basis. Thus, a PoAs is a deliberate effort implemented via an unlimited number of CPAs, which is a multitude of GHG reduction activities occurring over time in a single or multiple sites. The sites could be located within one or more city, region, or country.</td>
</tr>
<tr>
<td>- In the transportation sector, there are only three CDM projects registered worldwide (two large scale projects and one PoAs). The first large scale project worldwide was registered in 2006 (Project 062, the Bus Rapid Transit (BRT) system, TransMilenio, Bogotá, Colombia), while the first PoAs worldwide was registered in 2011 (PoAs 2897: Egypt Vehicle Scrapping and Recycling Program).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The core elements of any CDM methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Any CDM project must be registered by the CDM Executive Board of the UNFCCC. The project developer must submit a Project Design Document (PDD) to be assessed, and to make sure that the project complies with the CDM rules. The central elements of a PDD (and the project methodology) are: (1) the assessment and demonstration of additionality; (2) the identification of the baseline and the estimation of emission reductions; (3) the monitoring plan; (4) the presentation of the public stakeholder consultation; (5) the demonstration of achieving sustainable development; and (6) the availability of a managing entity (only in case of the PoAs). Each central element is described below.</td>
</tr>
<tr>
<td>- Additionality means that the project must prove that the emissions reduced are additional to any that would occur in the absence of the CDM project. In other words, the project must prove that other possible alternatives are considered. A list of barriers is taken as a proof of additionality. This list may include: the lack of finance required to construct the scrapping and recycling facilities and/or to provide layers of incentives to mitigate the resistance from the transport sector; and the lack of experience with replacement, scrapping, and recycling activities.</td>
</tr>
<tr>
<td>- The baseline for a transport CDM project is a conservative scenario estimating the emissions that would occur if the current transport system would be continued. Furthermore, the project developer should also estimate the emissions attributable to the CDM activity, leakages (e.g., emissions due to scrapping and recycling vehicles, and constructing the refueling stations in case of alternative fuels). The emissions reduction, thus, represents the baseline emissions minus leakage emissions.</td>
</tr>
<tr>
<td>- Several parameters have to be monitored and validated (e.g., the exact number of vehicles actually scrapped, fuel consumption per km for all eligible vehicles, and annual average distance driven by project vehicles).</td>
</tr>
<tr>
<td>- The project must also ensure that the PDD has been publicly available, comments have been invited from all local stakeholders, and the project owner has been responded adequately to any comments.</td>
</tr>
<tr>
<td>- The Kyoto Protocol clearly states that one of the purposes of the CDM is to assist Non-Annex I parties in achieving sustainable development. In other words, the funding channeled through the CDM projects should assist developing countries in reaching some of their social, economic, environmental, and sustainable development objectives, such as improving quality of life, alleviating poverty, providing financial returns to local entities, and reducing GHG emissions.</td>
</tr>
<tr>
<td>- The PoA provides the organizational, financial and methodological framework for the emission reductions, which should be managed or coordinated by a public or (national or international) private entity. The Managing Entity is the project participant which provides the framework and incentives for others to achieve the emission reductions. It must also specify the agreements, procedures, and bodies necessary in order to ensure that the integrated project components are established, and implemented in the timelines identified.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A very low success rate of CDM transport-sector projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Many CDM transport-sector methodologies have been submitted. But, as mentioned previously, only three projects have been successfully registered, which is very few compared to other sectors (e.g., chemical industries), although the contribution of the transport sector to the GHG emissions is high. The main reason identified for such a very low level of success rate is the methodological complexity of transport projects, especially concerning determination of baseline emissions, leakage effects, and monitoring requirements.</td>
</tr>
</tbody>
</table>

Source: Kfw-Entwicklungsbank (2008); Fenhann and Hinostroza (March 2011); The World Bank (2010a); CDM/UNFCCC (2012).
Several important points deserve more attention regarding tables 2.10 and 2.11 as follows. **First**, to limit the cost-burden on the government, the program has been structured as a *public-private partnership (PPP)*, with the provision of incentives spread across both the public sector (e.g., the managing entity and MOI) and the private sector (e.g., vehicle dealers, commercial banks, insurance companies, advertising agencies). In this respect, the PPP has enabled the NPVR to provide layers of financial incentives, reducing the capital investment required from the taxi owner (20-30% less than the normal price) (MOF, 2010a). In this respect, the scheme of the NPVR is believed to be a model of PPP innovation (Krambeck, 2010). **Second**, this PPP, however, has made the program scheme much more complex due to the participation of many public and private entities (table 2.12 lists the key roles and responsibilities of the NPVR participants). Therefore, there was a fear that this high degree of complexity might discourage the activity implementer (taxi owner) from participation, and as such reduce the participation rate. Thus, there was a need to find a solution for this issue. The program developers suggested and implemented the *concept of one-stop shop* (from surrendering and scrapping old vehicles, up to purchasing and registering a new vehicle) (CDM.UNFCCC, 2011; Kfw-Entwicklungsbank, 2008). Figure 2.3 provides a sketch for the Temporary Scrapping and Storage Facility within which the concept of one-stop shop is implemented. Also, photos 2.12-2.15 present several photos for this concept. (Please recall that all the photos are shown in Appendix A.1.) Figure 2.4 depicts the process map of replacement (from the perspective of the vehicle owner), while table 2.13 details the replacement process. **Third**, the PoAs is an umbrella program with a life-span of up to 28 years, comprised of Small-scale Component Project Activities (SSC-CPAs). The first two phases of the program cover taxis in the GCR (CDM.UNFCCC, 2011; MOF, 2010a). It includes eleven proposed SSC as shown in table 2.14.
### Table 2.12: The Key Roles and Responsibilities of the PoAs Participants

<table>
<thead>
<tr>
<th>Role</th>
<th>Key Roles and Responsibilities</th>
</tr>
</thead>
</table>
| **The Managing Entity (The MoF-Fund)** | - Manage and monitor all projects falling within the PoA, including the hire of a recycling firm;  
- Provide on-site general management, and coordinate the activities of all participants;  
- Provide vehicle owners with a payment of EGP 5,000 (subsidy) for surrendered eligible vehicles (incentive);  
- Exempt customs on imported components of the vehicle (incentive);  
- Pay vehicle sales taxes on behalf of the owner (incentive);  
- Guarantee the loan against default in the case vehicles cannot be recovered/re-possessed;  
- Place program advertising in local and national media;  
- Conduct quarterly quality assurance and quality control surveys among vehicle owners;  
- Manage comments and complaints received via hot-line and surveys;  
- Maintain registered project database; and  
- Upon PoA registration, shall oversee CDM project monitoring activities. |
| **The Vehicle Factories and Dealers (Five)** | - Provide discounted vehicles to eligible vehicle owners surrendering their old vehicles (incentive);  
- Prepare vehicles for mass transport use (e.g., install the air conditioning; meter and sign, and paint exteriors (White with White and Black Sticker));  
- Assist the vehicle owners in the licensing process;  
- Provide up-to 3-year warranty on vehicles;  
- Provide about 40 percent discount on the prices of spare parts, in addition to the priority in accessing the service stations, e.g., to undertake the routine maintenance (incentive);  
- Notify the bank if the vehicle owner did not perform the routine maintenance.  
- In case of loan default, repossess the vehicle, pays the outstanding loan to the bank, and resell the vehicle to another taxi buyer;  
- Provide branch office representatives at the Temporary Scrapping Site; and  
- Shall cooperate with MOF on arranging annual monitoring surveys after PoA registration (but shall not be responsible for conducting surveys). |
| **The Gas Companies** | - Convert the petrol vehicle to run on CNG, at a discounted price (incentive). |
| **The Advertising Firm** | - Provide loan supplements (EGP 550 monthly) plus monthly cash payment (EGP 100) to vehicle owners in exchange for use of internal and external advertising space (incentive);  
- Provide branch office representatives at the Temporary Scrapping and Intermediate Storage Site; and  
- Shall cooperate with MOF on arranging annual monitoring surveys after PoA registration (but shall not be responsible for conducting surveys). |
| **The Commercial Banks** | - Provide loans (without a maximum limit) to eligible vehicle owners surrendering their old vehicles. Due to scale and the low risk program, banks were able to charge interest rate below market ref which was 8-9 percent cut interest rate (incentive);  
- Notify the MOI in case of the borrowing had not paid two subsequent installments, or did not perform the routine maintenance; and  
- Provide branch office representatives at the Temporary Scrapping Site. |
| **The Insurance Firm** | - Provide comprehensive all-risk (causality and life), portfolio insurance for all replacement vehicles, at a discounted premium, 3 percent instead of 5 percent.  
- Provides branch office representative at the Temporary Scrapping Site. |
| **The MOI** | - Provide land for the two sites for the GCR projects;  
- Manage initial vehicle inspection;  
- Perform scrapping and storage operations;  
- Manage licensing and registration of new vehicles, at discounted fees (incentive);  
- Provide a license eligible to work in all Egyptian governorates, no restriction (incentive);  
- Enforce regulation (e.g., Traffic Law #121; and the use of the meters);  
- Provide security and monitoring services for both sites; and  
- Locate vehicles in case of loan default and violating the periodic maintenance agreement. |
| **The Vehicle Owner** | - Surrender the old vehicle in return of the layers of incentives designed especially for the program;  
- Be committed to all the terms of the mechanism. |
| **Recycling Firm** | - Perform all the scrapping and recycling operations according to the relevant regulations. |
| **The MOE** | - Be responsible for the program oversight from the environmental perspective;  
- Approving FESA and environmental management plan (EMP);  
- Give environmental permit to the private sector entity to operate the recycling facility;  
- Carry out spot-checks/audits of on-going operations of these facilities to ensure environment compliance to EMP; and  
- As the Designated National Authority (DNA), prepare Letter of Approval for program, confirming that it supports Egyptian sustainable development objectives. |

Source: Adapted from the MoF (2010a: 27-29).
Figure 2.3: The Concept of One-stop Shop

Figure 2.4: The Process Map of Replacement

Source: MOF (2010a: 30).

### Table 2.13: The Process Tasks of Replacement

<table>
<thead>
<tr>
<th>Step</th>
<th>Process Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Bank (1): Application for Bank Loan</strong>&lt;br&gt;The owner who agreed to participate should approach bank A to complete a loan application form and sign an authorization for a credit rating check. Upon completion of a positive credit rating check, the owner was expected to submit the required documentation to the bank, and the bank opened a current account on behalf of the owner in which the net down-payment was deposited. In this step, the following documents were issued and signed: preliminary approval letter issued by the bank; loan and insurance contracts to be signed by the vehicle owner; and signing of promissory notes for the vehicle and insurance loan.</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Vehicle Dealer (1): Designation of New Vehicles</strong>&lt;br&gt;The vehicle owner visited one of the two participating vehicle dealers and submitted the preliminary loan approval letter from the bank. The owner then requested a new vehicle, and the vehicle dealer reserved a vehicle for the owner by designating/specifying the new vehicle’s chassis and engine number. By specifying the engine and chassis number, the vehicle dealer was obligated to have this specific car manufactured and ready to be delivered to the owner within a reasonable timeframe. When the vehicle was ready for delivery, the vehicle dealer contacted the vehicle owner and issued “New Vehicle Designation Letter” which specified the new vehicle’s chassis number, engine number, model, etc.</td>
</tr>
<tr>
<td>3.</td>
<td><strong>The MOI (1): Inspecting and Scrapping the Old Vehicle</strong>&lt;br&gt;The owners brought their vehicles to the Traffic Department (MOI) where a technical engineer conducted a vehicle inspection. Upon successful completion of inspection, the vehicle license is cancelled. In return, the owner received an “Inspection Report” and “Scrapping Certificate”. In addition to inspecting and scrapping the old vehicles, the MOI is responsible for executing the storage operations*.</td>
</tr>
<tr>
<td>4.</td>
<td><strong>The MOF: Issuance of Subsidy Check</strong>&lt;br&gt;After completion of vehicle surrender, the vehicle owner submits the so far produced documents to the Program Coordinator (MOF) representative at the site (typically on the same day) in exchange for receipt of the vehicle subsidy check. The on-site representative enters data from these documents into a database, which is centrally managed by the MOF.</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Advertising Agency (1): Advertising Application</strong>&lt;br&gt;The owner applies for the ad program (optional), and submits the required documents. Upon approval, the agency then gives the vehicle owner a letter indicating his/her participation in the ad program.</td>
</tr>
<tr>
<td>6.</td>
<td><strong>The Bank (2): Bank Loan Final Approval</strong>&lt;br&gt;Upon receipt of the subsidy check from the EEAA, the vehicle owner returned to the bank to deposit the check in his or her current account. After the owner signed an official general power of attorney for the vehicle, with the bank as the beneficiary, the bank issued the driver the “Final Loan Approval Letter”.</td>
</tr>
<tr>
<td>7.</td>
<td><strong>The Vehicle Dealers (2): Receipt of New Vehicle and Preparing the License Package</strong>&lt;br&gt;The vehicle owner submitted the “Final Loan Approval Letter” to the vehicle dealer. In return, the vehicle dealer issued the driver a “Receipt for Purchase of New Vehicle” **.</td>
</tr>
<tr>
<td>8.</td>
<td><strong>The MOI (2): Vehicle License and Registration</strong>&lt;br&gt;Upon receipt and review of these materials, a new vehicle license was issued by MOI and given to the owner. With all paperwork in order, the vehicle owner was given her/his new vehicle.</td>
</tr>
<tr>
<td>9.</td>
<td><strong>Advertising Agency (2): Advertising Application</strong>&lt;br&gt;Upon receipt of new license and registration, the vehicle owner can then take their vehicle to the participating advertising agency to have ads applied to the vehicle.</td>
</tr>
</tbody>
</table>

*Source: Adapted from MOF (2010a: 36-37).*

*This process included: destruction of old vehicle’s chassis number and engine number; drainage of vehicle fuel; and removal of engine battery (MOF, 2010a).** The dealer received payment from the vehicle owner for compulsory insurance (in accordance with national law) and license tax, and prepared the corresponding receipts. The vehicle dealer also was responsible for assisting drivers in the licensing process: preparing the required documentation (e.g., Certificate for Meter) on behalf of the owner; and submitting the package to the MOI for licensing. Finally, the dealer was responsible for preparing vehicles for mass transport use (e.g., install meter and sign, and paint exteriors) (MOF, 2010a).
Table 2.14: The GCR Taxi SSC-CAPs Implementation Schedule

<table>
<thead>
<tr>
<th>CPA#</th>
<th>Months</th>
<th>Year</th>
<th>No. of Vehicles Scrapped</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>April</td>
<td>2009</td>
<td>763</td>
</tr>
<tr>
<td>2</td>
<td>May - June</td>
<td>2009</td>
<td>4,781</td>
</tr>
<tr>
<td>3</td>
<td>July - August</td>
<td>2009</td>
<td>4,793</td>
</tr>
<tr>
<td>4</td>
<td>September - October</td>
<td>2009</td>
<td>5,000</td>
</tr>
<tr>
<td>5</td>
<td>November - December</td>
<td>2009</td>
<td>5,000</td>
</tr>
<tr>
<td>6</td>
<td>January - February</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td>7</td>
<td>March - April</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td>8</td>
<td>May - June</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td>9</td>
<td>July - August</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td>10</td>
<td>September - October</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td>11</td>
<td>November - December</td>
<td>2010</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>50,337</td>
</tr>
</tbody>
</table>

Source: Adapted from CDM-UNFCCC (2009: 28). Please note that the first three CAPs are actual figures.

2.3.3 A Stylized Owner Spreadsheet Model

The following analysis examines the replacement problem of a profit-maximizing vehicle owner. This analysis, thus, is only concerned with a single asset case to be consistent with the ownership structure as shown in table 2.6. When examining this problem, two policies need to be determined jointly: optimal replacement policy; and optimal operating policy. The replacement policy deals with the optimal life of a vehicle. The optimal life of a vehicle can be defined as the period between the time the vehicle enters service (time $0$, or the beginning of the cycle) and the time when it should be replaced for economic reasons (time $n$, or the end of the cycle). The operating policy, on the other hand, deals with utilization and maintenance during the optimal life of the vehicle ($1-n$) (Hartman, 2004; Jin and Kite-Powell, 2000). Thus, it is important to develop a spreadsheet model that provides guidance on three aspects: (1) the net initial cost of the new taxi vehicle (at time $0$); (2) the operating policy (utilization and maintenance) of the new taxi vehicle ($1-n$); and (3) the replacement of the new taxi vehicle at the end of its optimal life (at time $n$). In table 2.15, the relevant literature is reviewed to identify the essential replacement parameters. Also, several assumptions related to the NPVR are discussed, and all preliminary calculations are made. Table 2.16 summarizes the input data for the spreadsheet model. Please note that, during this analysis, an optimal life of 5-7 years will be used. This optimal life will be justified in the third aspect (vehicle replacement).
Table 2.15: Vehicle Replacement (Parameters, Assumptions, and Calculations)

<table>
<thead>
<tr>
<th>The relevant literature</th>
<th>The NPVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>The net initial cost (at time 0)</td>
<td></td>
</tr>
<tr>
<td>The net initial cost = Cash outflows at time 0 – Cash inflows at time 0</td>
<td></td>
</tr>
<tr>
<td>Examples of the cash outflows are the discounted purchase price of the new vehicle (or the down-payment in case of finance), in addition to other initial costs like new vehicle registration. An example of the cash inflow is the scrapping value paid to the owner of the aging vehicle.</td>
<td>When replacing the gaining taxi vehicle, replacement is assumed to take place in two main scenarios, based on the choices available to the taxi owner participating in the program. The first scenario reflects the type of fuel chosen (Petrol model vs. CNG model), while the second scenario reflects the type of finance chosen (replacement with finance vs. self finance or buying with cash). The managing entity identified a set of eligible new vehicles, having different prices, ranging from EGP 42,000 to EGP 74,750 (MOF, 2010b). One eligible vehicle is the Lada 2107 (sedan). This vehicle will be used as the example vehicle of this spreadsheet model. This selection is based on three factors. First, the Lada taxi is one of the most widely used makes in the Egyptian market because it is more relevant to the taxi operations (e.g., the steel bodywork is reliable in extreme operating conditions, like poor roads, observed in the GCR) (Kfw-Entwicklungsbank, 2008). Second, this vehicle model is sold for a very competitive price. It is the lowest in the scheme in terms of price and thus relevant to the lower income level targeted by this replacement program. Third, previous studies undertaken by the relevant national and international bodies sought to study the operations of generic taxi vehicle in Egypt included the Lada make. In this respect, the high quality of information available will enhance the validity of the current analysis. The parameters related to the net initial cost are provided in table 2.1. Please note that the discounted purchase price for a petrol model is EGP 42,000, while the purchase price of a CNG model is EGP 45,000.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The operating policy (1-n)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The operating policy is concerned with the annual cost factors and income sources of the new vehicle during its optimal life. Cost related factors include: fuel cost; maintenance and repair costs; finance and insurance, and parking. A central parameter related to the operating policy is the average distance travelled each year. Most of the studies concerning the user preference utilization pattern, for simplicity, assume a constant distance driven each year for a vehicle, regardless of the age of the vehicle. This constant km driven approximates the known owner driving pattern. Though, the vehicle should be properly maintained. The constant annual distance driven differs according to the purpose of vehicle (e.g., an average of 19,308 km is assumed for household vehicle, while an average of 82,059 km is assumed for taxi vehicle, more than 4 times the km driven by a private vehicle).</td>
<td>Based on the experience of more than 300 taxi owners/drivers, the EEAA and Kfw developed a framework for a set of models operated under typical or national average conditions. According to the Kfw-Entwicklungsbank (2008), the average annual km driven by a (1990-2008 and new) taxi vehicle is 62,400 km as shown in the table below.</td>
</tr>
<tr>
<td>The Annual Distance Traveled by a generic Taxi Vehicle (1990-2008 and new models)</td>
<td></td>
</tr>
<tr>
<td>Distance per day (km)</td>
<td></td>
</tr>
<tr>
<td>Days worked per year</td>
<td></td>
</tr>
<tr>
<td>Distance per year (km) = distance per day x days worked per year</td>
<td></td>
</tr>
<tr>
<td>Source: Compiled from Entwicklungsbank (2008).</td>
<td></td>
</tr>
</tbody>
</table>

Operating income

The annual income flowing from the taxi vehicle is broken into two major sources: operating income; and
Chapter 2 The Research Context

There are two sources of vehicle income: operating income; and resale value. The latter will be taken into consideration at time \( n \). Operating income flowing from vehicle services is the main source of vehicle income, and is a function of its utilization. According to the Kfw-Entwicklungsbank (2008), while the average distance driven each day by a generic taxi vehicle is 200 km, the average fare distance per day is only 105 km. The average fare distance per km is estimated to EGP 2. The second source of income is the ad agency which pays a monthly amount to the taxi owner in exchange for use of internal and external advertising space. The annual income from the ad agency was initially set to be EGP 6,600 annually. This amount has been reduced to be EGP 3,060 annually. These two main sources of income are shown below.

<table>
<thead>
<tr>
<th>The Average Annual Income of a Taxi Owner</th>
<th>Petrol</th>
<th>CNG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fare distance per day (km)</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Fare per km</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Average daily income = fare distance per day x fare per km</td>
<td>210</td>
<td>210</td>
</tr>
<tr>
<td>Days worked per year</td>
<td>312</td>
<td>312</td>
</tr>
<tr>
<td>Total operating income per year*</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
<td>Income from ad agency per year</td>
<td>3,060</td>
<td>3,060</td>
</tr>
</tbody>
</table>

Source: Compiled from Entwicklungsbank (2008). Calculations are our own.

* Please note that the taxi drivers do not pay income tax.

Thus, on average, a taxi owner spends nearly (105km /200km) 47.5% of the day running empty, and without fare (please recall that these taxis are not booked by phone, and do not have designated ranks where they wait for passengers. Rather, they are hailed in the street).

**Fuel cost:**

Fuel consumption per year = distance per year / fuel economy rate  
Fuel cost per year = fuel consumption per year x fuel price

Two variables need to be discussed: fuel economy rate; and fuel price. In most of the studies reviewed, fuel economy is held constant with age, and a decline in fuel economy is neglected, mainly because changes in fuel economy are unpredictable. Fuel prices, on the other hand, need to reflect any annual increase observed in historical data. Also, when alternative fuels (e.g., natural gas) are considered, the extra cost of these fuel alternatives needs to be taken into consideration. More specifically, if the refueling infrastructure of these alternative fuels is not well developed or not widely accessible, the travel cost to and from the refilling stations should be added.

Regarding fuel economy, fuel consumption of a generic taxi vehicle is taken from the standard project vehicle fuel efficiency data mentioned in the PoA 2897 (CDM.UNFCCC, 2011). The vehicle fuel efficiency for petrol (l/km) and CNG (m$^3$/km) is shown below. Please note that a cubic meter of CNG provides more energy than a liter of petrol (octane 90). Also please note that fuel efficiency is constant for the first 3 years, and begins to decrease gradually in the following 4 years. Regarding the fuel price, the pump price of petrol is EGP 1.75 per liter, while the pump price of CNG is EGP 0.45 per m$^3$. The pump price of one liter of petrol is suggested to be increased 2% annually because it is heavily subsided. No suggestion has been made to inflate the pump price of CNG because it is not heavily subsided, available in the local market, and promoted to be a widely used alternative for petrol. Please note that, as mentioned previously, the refueling infrastructure of the CNG is widely available and easily accessible. Thus, it is assumed that the vehicle...
The annual fuel cost for petrol and CNG models is calculated below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Petrol (l/km)*</th>
<th>Price (2% increase)**</th>
<th>Cost per km</th>
<th>Distance (year)</th>
<th>Total petrol cost</th>
<th>CNG (m³3/km)*</th>
<th>Price**</th>
<th>Cost per km</th>
<th>Distance</th>
<th>Total CNG cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0939</td>
<td>1.75</td>
<td>0.1643</td>
<td>62,400</td>
<td>10,254</td>
<td>0.0834</td>
<td>0.45</td>
<td>0.0375</td>
<td>62,400</td>
<td>2,342</td>
</tr>
<tr>
<td>2</td>
<td>0.0939</td>
<td>1.785</td>
<td>0.1676</td>
<td>62,400</td>
<td>10,459</td>
<td>0.0834</td>
<td>0.45</td>
<td>0.0375</td>
<td>62,400</td>
<td>2,342</td>
</tr>
<tr>
<td>3</td>
<td>0.0939</td>
<td>1.8207</td>
<td>0.1710</td>
<td>62,400</td>
<td>10,668</td>
<td>0.0834</td>
<td>0.45</td>
<td>0.0375</td>
<td>62,400</td>
<td>2,342</td>
</tr>
<tr>
<td>4</td>
<td>0.0948</td>
<td>1.8571</td>
<td>0.1761</td>
<td>62,400</td>
<td>10,986</td>
<td>0.0842</td>
<td>0.45</td>
<td>0.0379</td>
<td>62,400</td>
<td>2,364</td>
</tr>
<tr>
<td>5</td>
<td>0.0958</td>
<td>1.8943</td>
<td>0.1815</td>
<td>62,400</td>
<td>11,324</td>
<td>0.0851</td>
<td>0.45</td>
<td>0.0383</td>
<td>62,400</td>
<td>2,390</td>
</tr>
<tr>
<td>6</td>
<td>0.0968</td>
<td>1.9321</td>
<td>0.1870</td>
<td>62,400</td>
<td>11,671</td>
<td>0.0859</td>
<td>0.45</td>
<td>0.0387</td>
<td>62,400</td>
<td>2,421</td>
</tr>
<tr>
<td>7</td>
<td>0.0977</td>
<td>1.9708</td>
<td>0.1925</td>
<td>62,400</td>
<td>12,015</td>
<td>0.0868</td>
<td>0.45</td>
<td>0.0391</td>
<td>62,400</td>
<td>2,437</td>
</tr>
</tbody>
</table>

** Source: petroleum product prices were taken from the Ministry of Petroleum (MOP, 2011).

Maintenance and repairs:

Maintenance cost is essential to keep the vehicle in good working conditions through maintaining structural integrity and effective function. Scheduled (preventive) maintenance activities and intervals are determined from interviews with representative service centers, through consultation of service manuals, and/or through actual operator/driver files. Repair cost, due to unexpected component failure, also needs to be taken into consideration. One major source used when calculating such a challenging aspect is published reports (e.g., Consumer Reports and IntelliChoice reports). Many of the studies reviewed combines scheduled maintenance (except tire replacement) and unscheduled repairs together, and calculate this cost factor per km. Thus, this cost factor will be held constant when using the constant km pattern. Other studies do not shrink the problem and assume that vehicles require more maintenance and repair cost as they get older, in part because of engineering-related or built-in limitation to durability. Some studies escalate both the annual cost of maintenance and repairs by CPI, while others escalate only the repair costs.

The Kfw undertook a context-specific study to estimate the maintenance and repair costs reflecting the cost of operating a taxi vehicle in the GCR. This study, thus, was based on the actual taxi driver experience. The study estimated that the cost of maintenance and repairs would be EGP 0.09 per km driven for 1970-1979 models, and EGP 0.10 per km driven for 1980-new models (Kfw-Entwicklungsbank, 2008).

As the previous study was conducted before the development of the program protocol, additional information was required to develop expectations based on the actual terms mentioned in the protocol signed by the auto dealers. Thus, I updated this study by making telephone interviews with two certified service centers of the example vehicle, and also through consultation of user manual. In this respect, I found that there are 28 scheduled maintenance activities. These include cleaning, inspecting, checking, adjusting, and/or replacing items. These activities can be categorized based on frequency into groups: every 20,000 km activities (e.g., changing oil and oil filter, rotating tires, inspecting the bodywork, and inspecting front brakes pads and shoes); every 40,000 km activities (e.g., replacing air filter, and replacing spark plugs and inspecting wires); every 60,000 km activities (e.g., replacing pan gasket and fluid of transaxle, changing the brake oil, and replacing the set of four tires); and every 80,000 km activities (e.g., inspecting fuel tank cap and lines). According to the program protocol, the taxi owner must comply with the maintenance terms identified by each auto dealer. Based on the previous, I calculated the total annual maintenance and repair costs under the constant annual km mentioned previously (62,400 km). The service and parts charges for maintenance are obtained from the two certified service centers of the example vehicle. The annual costs of maintenance and repairs were scaled according to the average CPI, as suggested by the certified service owner, who chooses this alternative, will not bear extra cost. The total petrol and CNG cost is calculated below.

**Maintenance and repairs:**

The owner, who chooses this alternative, will not bear extra cost. The total petrol and CNG cost is calculated below.
stations. The annual maintenance and repair costs are provided below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Costs (current prices)</th>
<th>Costs (adjusted by CPI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,870</td>
<td>4,870</td>
</tr>
<tr>
<td>2</td>
<td>6,789</td>
<td>7,495</td>
</tr>
<tr>
<td>3</td>
<td>6,537</td>
<td>7,967</td>
</tr>
<tr>
<td>4</td>
<td>6,567</td>
<td>8,836</td>
</tr>
<tr>
<td>5</td>
<td>8,234</td>
<td>12,232</td>
</tr>
<tr>
<td>6</td>
<td>4,648</td>
<td>7,623</td>
</tr>
<tr>
<td>7</td>
<td>8,234</td>
<td>14,908</td>
</tr>
</tbody>
</table>

* Source: Based on telephone interviews with two certified service centers of the example vehicle, and also through consultation of user manual.

Please recall that the average CPI is 10.4% (table 2.1). Thus, the maintenance and repair cost for, for example, year 3 will be EGP 6,537 x (1.104)^2 = EGP 7,967.

**Financing and insurance:**

New vehicle may be purchased with: (1) finance using a personal loan (e.g., 20% down-payment, followed by 4 years of payments with a 9% interest rate); or (2) cash. In the studies reviewed, I found that the financing charges were taken into consideration, while the opportunity cost of cash purchase was neglected. The relevant literature also shows that insurance rates are highly variable as they depend on many variables related to the individual owner characteristics (e.g., the vehicle age, the policyholder age, the driving history, the area of operation, and the type of coverage).

Nearly 93 percent of the new taxi vehicles purchased (until Dec, 2010) had been financed using a new financial product developed specifically for this under bankable segment. The participating banks offer a loan with 0% down-payment, followed by 5, 6, or 7 years of payments with 11.5% nominal interest rate (MOF, 2010b). The annual installment is divided into monthly installments to be paid by the taxi owner. An insurance firm has been contracted to provide comprehensive, all risk (portfolio) coverage. The annual insurance premium is paid by the banks in behalf of the policyholder (taxi owner), and divided into monthly payments, and added to the loan monthly payments paid by the owner to the banks. The annual installments of loan and insurance are shown below for 5-, 6-, and 7-year loan periods.

<table>
<thead>
<tr>
<th>Loan Term</th>
<th>Petrol</th>
<th>CNG</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 year</td>
<td>11,532</td>
<td>12,456</td>
</tr>
<tr>
<td>6 year</td>
<td>10,428</td>
<td>11,244</td>
</tr>
<tr>
<td>7 year</td>
<td>9,672</td>
<td>10,440</td>
</tr>
</tbody>
</table>

Source: Calculated from MOF (2010b).

The participant taxi owners who prefer to pay the purchase price in cash (without taking a loan) may purchase the insurance coverage from the insurance company (MOF, 2010b). The annual insurance percentage is 3.3% (after deducting an annual depreciation percentage of 7% from the purchase price). The annual insurance premiums for Petrol and CNG models are shown below.
Chapter 2 The Research Context

### The Annual Insurance Premium in Case of Cash Purchase Only

<table>
<thead>
<tr>
<th></th>
<th>Petrol</th>
<th>CNG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium for year 1 = 3.3% x Initial price</td>
<td>1,386</td>
<td>1,485</td>
</tr>
<tr>
<td>Premium for year 2 = 3.3% x Initial price x 93%</td>
<td>1,289</td>
<td>1,381</td>
</tr>
<tr>
<td>Premium for year 3 = 3.3% x Initial price x 86%</td>
<td>1,192</td>
<td>1,277</td>
</tr>
<tr>
<td>Premium for year 4 = 3.3% x Initial price x 79%</td>
<td>1,095</td>
<td>1,173</td>
</tr>
<tr>
<td>Premium for year 5 = 3.3% x Initial price x 72%</td>
<td>998</td>
<td>1,069</td>
</tr>
<tr>
<td>Premium for year 6 = 3.3% x Initial price x 65%</td>
<td>901</td>
<td>965</td>
</tr>
<tr>
<td>Premium for year 7 = 3.3% x Initial price x 58%</td>
<td>804</td>
<td>861</td>
</tr>
</tbody>
</table>

**Source:** After consulting the insurance contract.

### Direct labor

The average monthly wage for two drivers (each driver works 1 shift/day, 8 hours/shift, 6 days/week) is EGP 1,900. Thus, the average annual cost of direct labor is EGP 22,800. **Permits.** Taxi permits equal EGP 1,500 per year (Kfw-Entwicklungsbank, 2008).

### Vehicle Replacement (at time \( n \))

Two parameters need to be considered at time \( n \): the resale value; and the purchase price of a replacement vehicle. However, before discussing these two points, it is important to discuss the optimal time of replacement. In each year, the vehicle owner may face the following decision: keep the existing vehicle, or replace it with a new vehicle? The answer depends on the perspective adopted: environmental perspective; or profit maximizing perspective. The current analysis is concerned only with the profit maximizing perspective.

Some studies suggest that the replacement interval should be informed by the net present value (NPV) criterion. Thus, the replacement interval that maximizes the present value of net revenues (net operating revenues plus net resale revenue) should be chosen. Moreover, many studies show that the operating policy followed by the vehicle owner suggests different replacement intervals. For example, vehicles that follow soft operating policy (e.g., household vehicle) have longer replacement interval (e.g., 12-20 years). On the other hand, vehicles that follow hard operating policy should have shorter replacement interval. For example, taxi fleets in New York are replaced every 3 years, while taxis in Beijing are replaced when they are 6-8 years old.

The maximum replacement interval identified in the literature is 5 years for vehicles following a hard operating policy. However, the promising financial incentive package introduced by the NPVR (especially the discounted dealer price at time 0, and the ad income during 7 years) may encourage taxi owners to keep their vehicles for another two years. Therefore, I decided to incorporate years 6 and 7 into the replacement analysis, and to select the replacement interval that will produce the highest NPV. The Microsoft Excel 2007 was used to calculate the NPV.

The Excel formula is: \[=\text{NPV}(\%, \text{NCF}_1, \text{NCF}_2, \ldots, \text{NCF}_n) - \text{Net initial cost}\]. Where \(\%\) denotes the discount interest rate used in the analysis. I used the nominal loan interest rate (11.5% annually, after consulting the loan contract) of the financial product of vehicle replacement.
The resale value:

Some studies consider the resale (or fair market) value of a vehicle at various stages of its service life. While nearly all vehicles depreciate in value over time, the depreciation rate for a specific vehicle may depend on several factors, including brand image (as some vehicles experience low rates of depreciation, and as such slower decline in value, than other brands), vehicle class, new model pricing, passage of time, the operating policy (mainly the odometer reading and maintenance), the demand for a particular make and model of the vehicle in the second-hand market, and the area of operation. The nature of the economy also matters. In many developed economies, the replacement concept is well established, and vehicles may be replaced at equal time intervals, assuming constant depreciation rates. In many less developed economies, the owners work their vehicles on the basis of a single indefinite period, with or without scrapping. Depreciation, thus, reflects the reduction of vehicle value over time, and this reduction is attributed to many factors, including the nature of the context. In any case, when the operating policy of a vehicle is described as hard, a low resale revenue (and as such high depreciation rate) is expected.

Please note that, in the studies reviewed, I found that the main sources of resale value were published reports (e.g., Kelley Blue Book) and online websites managed by vehicle valuation companies.

First of all, I assume that the taxi owner will continue the taxi business by keeping the taxi plate to use it on a new vehicle, and selling the current vehicle as a private vehicle. (Please note that the market value of the plate alone has reached more than EGP 20,000 as the number of taxi licenses in the GCR was capped in 2006.)

Regarding the resale value, there are no published appraisal guides or well developed valuation websites. Thus, three used auto dealers (A, B, and C) dealing in the example vehicle were contacted to estimate the resale value of the vehicle during a 7 year life, taking into consideration the operating policy of the vehicle (e.g., being a taxi not a private vehicle, the constant km driven each year, and being complied with maintenance and repair terms mentioned in the protocol). The three dealers provided different profiles for annual reduction percentage. For example, dealer A stated that he would reduce 28% of the vehicle price if bought after 1 year, and reduce 87% of the price if bought after 6 years. I calculated the average reduction percentage of the three dealers, as shown below. Then, I calculated the average resale value for both Petrol and CNG models.

### Average Reduction Percentage and Average Resale Values

<table>
<thead>
<tr>
<th>Resale Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>n = 5</th>
<th>n = 6</th>
<th>n = 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction % (Dealer A)*</td>
<td>28%</td>
<td>49%</td>
<td>64%</td>
<td>76%</td>
<td>82%</td>
<td>87%</td>
<td>91%</td>
</tr>
<tr>
<td>Reduction % (Dealer B)*</td>
<td>25%</td>
<td>44%</td>
<td>58%</td>
<td>66%</td>
<td>73%</td>
<td>79%</td>
<td>84%</td>
</tr>
<tr>
<td>Reduction % (Dealer C)*</td>
<td>22%</td>
<td>42%</td>
<td>54%</td>
<td>63%</td>
<td>70%</td>
<td>76%</td>
<td>81%</td>
</tr>
<tr>
<td>Average reduction %</td>
<td>25%</td>
<td>45%</td>
<td>59%</td>
<td>68%</td>
<td>75%</td>
<td>81%</td>
<td>85%</td>
</tr>
<tr>
<td>Average resale value (Petrol)**</td>
<td>31,500</td>
<td>23,100</td>
<td>17,220</td>
<td>13,440</td>
<td>10,500</td>
<td>7,980</td>
<td>6,300</td>
</tr>
<tr>
<td>Average resale value (CNG)**</td>
<td>33,750</td>
<td>24,750</td>
<td>18,450</td>
<td>14,400</td>
<td>11,250</td>
<td>8,550</td>
<td>6,750</td>
</tr>
</tbody>
</table>

* Source: Based on telephone interviews with three used auto dealers dealing in the example vehicle.

** Average resale value = purchase price x (1 – average reduction percentage). Please recall that the purchase price for a Petrol model is EGP 42,000, and for a CNG model is 45,000.

The estimated purchase price of a replacement vehicle:

When estimating the purchase price of a new vehicle after a specific period, any expected increase in the purchase price of a new vehicle should be taken into consideration. I found two methods used to estimate the future purchase price: escalating the future prices by the CPI; or developing a simple linear regression equation, based on the historical retail prices. Please note that, for simplicity, many studies assumes that the owner will buy another identical vehicle.

Please note that there is no evidence that the NPVR will be a permanent instrument, and the same taxi owner will be allowed to participate again. Thus, I assume that the owner will make self replacement. I also assume that the vehicle owner will immediately purchase the same model (new not used). A simple linear regression equation was derived from the 2000-2010 retail price data. The retail prices for petrol and CNG models are shown below (please note that year 1 represents year 2000, while year 11 represents year 2010).
# Chapter 2 The Research Context

## The Retail Prices of Petrol and CNG Models (Years 2000-2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol</td>
<td>32,100</td>
<td>34,000</td>
<td>35,600</td>
<td>38,000</td>
<td>40,500</td>
<td>42,700</td>
<td>45,000</td>
<td>46,200</td>
<td>48,000</td>
<td>50,200</td>
<td>52,500</td>
</tr>
<tr>
<td>CNG</td>
<td>37,100</td>
<td>39,000</td>
<td>40,600</td>
<td>43,000</td>
<td>45,500</td>
<td>47,700</td>
<td>50,000</td>
<td>50,200</td>
<td>52,000</td>
<td>54,200</td>
<td>56,500</td>
</tr>
</tbody>
</table>

Source: Based on telephone interviews with the auto dealer of the example vehicle.

Microsoft Excel 2007 was used to develop the regression equation. Years from 1 to 11 were identified as the X values, while the corresponding retail prices were identified as the Y values. A scatterplot was created from the values of X and Y. Then, a trendline was added. The regression equations derived are:

\[
Y_T = 2,044.5 \times X_T + 29,987 \quad \text{for the petrol model}
\]

\[
Y_T = 1,917.3 \times X_T + 35,387 \quad \text{for the CNG model}
\]

## The Estimated Purchase Prices after 5, 6, and 7 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>(X^*)</th>
<th>The regression equation of Petrol model</th>
<th>The regression equation of CNG model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 5</td>
<td>16</td>
<td>(Y_T = (2,044.5 \times 16) + 29,987)</td>
<td>(Y_T = (1,917.3 \times 16) + 35,387)</td>
</tr>
<tr>
<td>Year 6</td>
<td>17</td>
<td>(Y_T = (2,044.5 \times 17) + 29,987)</td>
<td>(Y_T = (1,917.3 \times 17) + 35,387)</td>
</tr>
<tr>
<td>Year 7</td>
<td>18</td>
<td>(Y_T = (2,044.5 \times 18) + 29,987)</td>
<td>(Y_T = (1,917.3 \times 18) + 35,387)</td>
</tr>
</tbody>
</table>

Source: Self.

* Years 5, 6, and 7 are replaced by their order in the time series, being 16, 17, and 18.

Source: Ahmed (1973); Alberini and Harrington (1995); Jong (1996); Kavalec and Setiawan (1997); Greenspan and Cohen (1999); Jin and Kite-Powell (2000); Van Wee, et al. (2000); Hackney and de Neufville (2001); Hartman (2004); Kim, et al. (2004); Spitzley, et al. (2005); Suzuki and Pautsch (2005); Chen and Lin (2006); Hao, et al. (2006); Bitros and Flytzanis (2009); Parthanadee et al. (2012); Pasaoglu et al. (2012); Stasko and Gao (2012).
### Table 2.16: A Summary of the Input Data of Spreadsheet Model (base year: 2010)

<table>
<thead>
<tr>
<th></th>
<th>Petrol Model</th>
<th>CNG Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial cost (at time 0)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discounted dealer price</td>
<td>EGP 42,000</td>
<td>EGP 45,000</td>
</tr>
<tr>
<td>Scrap value paid to the taxi owner</td>
<td>EGP 5,000</td>
<td>EGP 5,000</td>
</tr>
<tr>
<td>Net price (cash purchase) = discounted dealer price – scrap value paid to the taxi owner</td>
<td>EGP 37,000</td>
<td>EGP 40,000</td>
</tr>
<tr>
<td>Down-payment when taking 5-, 6-, or 7-year loan</td>
<td>EGP 0</td>
<td>EGP 0</td>
</tr>
<tr>
<td>Permits</td>
<td>EGP 1,500</td>
<td>EGP 1,500</td>
</tr>
<tr>
<td><strong>Taxi vehicle utilization (from year 1 to n; n = year 5, 6, or 7)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total operating income per year (average)</td>
<td>EGP 65,520</td>
<td>EGP 65,520</td>
</tr>
<tr>
<td>Income from ad agency per year</td>
<td>EGP 3,060</td>
<td>EGP 3,060</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost for year 1</td>
<td>EGP 10,254</td>
<td>EGP 2,342</td>
</tr>
<tr>
<td>for year 2</td>
<td>EGP 10,459</td>
<td>EGP 2,342</td>
</tr>
<tr>
<td>for year 3</td>
<td>EGP 10,668</td>
<td>EGP 2,342</td>
</tr>
<tr>
<td>for year 4</td>
<td>EGP 10,986</td>
<td>EGP 2,364</td>
</tr>
<tr>
<td>for year 5</td>
<td>EGP 11,324</td>
<td>EGP 2,390</td>
</tr>
<tr>
<td>for year 6</td>
<td>EGP 11,671</td>
<td>EGP 2,412</td>
</tr>
<tr>
<td>for year 7</td>
<td>EGP 12,015</td>
<td>EGP 2,437</td>
</tr>
<tr>
<td>Maintenance &amp; repairs for year 1</td>
<td>EGP 4,870</td>
<td>EGP 4,870</td>
</tr>
<tr>
<td>for year 2</td>
<td>EGP 7,495</td>
<td>EGP 7,495</td>
</tr>
<tr>
<td>for year 3</td>
<td>EGP 7,967</td>
<td>EGP 7,967</td>
</tr>
<tr>
<td>for year 4</td>
<td>EGP 8,836</td>
<td>EGP 8,836</td>
</tr>
<tr>
<td>for year 5</td>
<td>EGP 12,232</td>
<td>EGP 12,232</td>
</tr>
<tr>
<td>for year 6</td>
<td>EGP 7,623</td>
<td>EGP 7,623</td>
</tr>
<tr>
<td>for year 7</td>
<td>EGP 14,908</td>
<td>EGP 14,908</td>
</tr>
<tr>
<td>Annual installments (for bank loan plus insurance) over 5 years loan term</td>
<td>EGP 11,532</td>
<td>EGP 12,456</td>
</tr>
<tr>
<td>over 6 years loan term</td>
<td>EGP 10,428</td>
<td>EGP 11,244</td>
</tr>
<tr>
<td>over 7 years loan term</td>
<td>EGP 9,672</td>
<td>EGP 10,440</td>
</tr>
<tr>
<td>Insurance premium for year 1</td>
<td>EGP 1,386</td>
<td>EGP 1,485</td>
</tr>
<tr>
<td>for year 2</td>
<td>EGP 1,289</td>
<td>EGP 1,381</td>
</tr>
<tr>
<td>for year 3</td>
<td>EGP 1,192</td>
<td>EGP 1,277</td>
</tr>
<tr>
<td>Year</td>
<td>Cost (EGP)</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1,095</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>998</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>901</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>804</td>
<td></td>
</tr>
</tbody>
</table>

Direct labor per year (2 drivers in two shifts, 10 hours in each shift; 6 days per week)

Permits per year

| Vehicle replacement at \( n \) (\( n = 5, 6, \) or 7) |
|---------------------------------|-------------|
| Resale value at the end of year 5 | EGP 10,500  |
| at the end of year 6              | EGP 7,980   |
| at the end of year 7              | EGP 6,300   |
| Estimated dealer price after 5 years | EGP 62,699  |
| after 6 years                     | EGP 64,744  |
| after 7 years                     | EGP 66,788  |

Source: Self.
Analyzing the replacement problem, from the point view of the taxi owner, shows that several scenarios could be offered: two scenarios based on the fuel type (Petrol model vs. CNG model); and two scenarios based on the purchase method (Loan vs. Cash). I calculated the net present value (NPV) to identify the best scenario, using several different replacement intervals \((n = 5, 6, \text{or } 7)\). Table 2.17 presents the NPV for these four replacement scenarios at the identified replacement intervals. Tables 2.18 and 2.19 are examples of the spreadsheet models created using MS Excel 2007 (please note that the spreadsheet model of all scenarios considered is provided in Appendix A.2).

Table 2.17: The NPV of Several Replacement Scenarios

<table>
<thead>
<tr>
<th>Purchase Method</th>
<th>Fuel Type</th>
<th>(n = 5)</th>
<th>(n = 6)</th>
<th>(n = 7)</th>
<th>(n = 5)</th>
<th>(n = 6)</th>
<th>(n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan</td>
<td>Petrol Model</td>
<td>20,556</td>
<td>32,929</td>
<td>40,987</td>
<td>46,169</td>
<td>63,351</td>
<td>75,777</td>
</tr>
<tr>
<td>Cash</td>
<td>Petrol Model</td>
<td>21,328</td>
<td>34,521</td>
<td>43,475</td>
<td>46,889</td>
<td>64,996</td>
<td>78,541</td>
</tr>
<tr>
<td>Loan</td>
<td>CNG Model</td>
<td>40,987</td>
<td>46,169</td>
<td>63,351</td>
<td>75,777</td>
<td>75,777</td>
<td>75,777</td>
</tr>
<tr>
<td>Cash</td>
<td>CNG Model</td>
<td>43,475</td>
<td>46,889</td>
<td>64,996</td>
<td>78,541</td>
<td>78,541</td>
<td>78,541</td>
</tr>
</tbody>
</table>

Source: Self.

Based on the fuel type, the results show that, in all the replacement intervals used \((n = 5, 6, \text{or } 7)\) and despite the purchase method used (loan vs. cash), choosing a CNG model produces a higher NPV although the retail price of the CNG model is higher than the retail price of the Petrol model. The main reason is that the CNG model provides a substantial fuel cost reduction. If the purchase method is considered, purchasing with cash provides a slightly higher NPV than using the loan facility. Here, two points deserve mention. First, the opportunity cost was neglected when calculating the NPV of cash purchase. Thus, I expect that the NPV of cash purchase will be lower if the opportunity cost is accounted for. Second, the majority of these taxi owners lack the ability to pay with cash, and thus using the loan facility is the optimal choice. When investigating the replacement problem at different replacement intervals \((n = 5, 6, \text{or } 7)\), I find that replacing the taxi vehicle after 7 years provides the highest NPV, despite the increasing trend of many cost factors (e.g., maintenance and repair cost), and also the increasing trend of capital loss (the purchase price of a replacement vehicle at the end minus the resale value). The main reason is the use of the constant distance traveled each year during the optimal life. All in all, buying a CNG model with the loan facility, and keeping the vehicle for 7 years will provide the highest NPV for the taxi owner. (Please note that the spreadsheet model may be used conveniently by taxi owners to find their unique vehicle replacement solutions. Other scenarios also could be taken into consideration.)
Table 2.18: The NPV of CNG Model Purchased with Loan ($n = 7$ years)

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Initial Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down payment</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net Initial cost</strong></td>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
<td>From ad agency</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
</tr>
<tr>
<td>Resale value at the end</td>
<td>6,750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total income</strong></td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>75,330</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
<td>2,342</td>
<td>2,342</td>
<td>2,342</td>
<td>2,364</td>
<td>2,390</td>
<td>2,412</td>
<td>2,437</td>
<td></td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
<td>4,870</td>
<td>7,495</td>
<td>7,987</td>
<td>8,836</td>
<td>12,322</td>
<td>7,623</td>
<td>14,908</td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
</tr>
<tr>
<td>Permits</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>0</td>
</tr>
<tr>
<td>Installment</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
<td>10,440</td>
</tr>
<tr>
<td><strong>Purchase price at the end</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>69,898</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td>41,952</td>
<td>44,577</td>
<td>45,049</td>
<td>45,940</td>
<td>49,362</td>
<td>44,775</td>
<td>120,483</td>
<td></td>
</tr>
<tr>
<td><strong>Net Cash Flow (NCF)</strong></td>
<td>1,500</td>
<td>26,628</td>
<td>24,003</td>
<td>23,531</td>
<td>22,640</td>
<td>19,218</td>
<td>23,805</td>
<td>-45,153</td>
</tr>
<tr>
<td><strong>NPV (11.5% discount rate)</strong></td>
<td>75,777.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Self (please recall that the spreadsheet model of all scenarios considered is provided in Appendix A.2).
### Table 2.19: The NPV of Petrol Model Purchased with Cash (n = 6 Years)

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Initial Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net price</td>
<td>37,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost</td>
<td>40,810</td>
<td>43,543</td>
<td>44,127</td>
<td>45,217</td>
<td>48,854</td>
<td>107,739</td>
<td></td>
</tr>
<tr>
<td>Total income</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>76,560</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td></td>
</tr>
<tr>
<td>From ad agency</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td></td>
</tr>
<tr>
<td>Resale value at the end</td>
<td>7,980</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
<td>10,254</td>
<td>10,459</td>
<td>10,668</td>
<td>10,986</td>
<td>11,324</td>
<td>11,671</td>
<td></td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
<td>4,870</td>
<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
<td>7,623</td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td></td>
</tr>
<tr>
<td>Permits</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Insurance premiums</td>
<td>1,386</td>
<td>1,289</td>
<td>1,192</td>
<td>1,095</td>
<td>998</td>
<td>901</td>
<td></td>
</tr>
<tr>
<td>Purchase price at the end</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>64,744</td>
<td></td>
</tr>
<tr>
<td>Net Cash Flow (NCF)</td>
<td>38,500</td>
<td>27,770</td>
<td>25,037</td>
<td>24,453</td>
<td>23,363</td>
<td>19,726</td>
<td></td>
</tr>
<tr>
<td>NPV (11.5% discount rate)</td>
<td>34,520.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Self (please recall that the spreadsheet model of all scenarios considered is provided in Appendix A.2).
2.3.4 The Impact of the NPVR on the Context (The Benefits)

The main objective of the NPVR is to develop sustainable mobility solutions. In this respect, the benefits of the NPVR are identified and organized after reviewing the relevant literature, namely the literature linking the Clean Development Mechanism (CDM) projects to sustainable development (e.g., Fenhann and Hinostroza, March 2011). When comparing between the baseline context and the context after implementing the initial CAPs of the NPVR, a set of benefits could be identified, as shown in table 2.20.
On the National Level

<table>
<thead>
<tr>
<th>Environmental benefits</th>
<th>Social benefits</th>
<th>Economic benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality; improving air quality by reducing the emission loads in the GCR (one of the most polluted megacities in the world). This is achieved by replacing the high emitters (aging vehicles) with low emitters, and also by encouraging the use of natural gas (environmentally clean fuel). This is also known as reducing negative externalities. The initial CAPs are estimated to reduce 20 metric tons of CO₂ equivalent per annum for 10 years (the CAPs cycle). As the NPVR is PoAs, the addition of more CAPs covering taxis and microbuses in the other Egyptian regions will significantly increase the annual reduction in CO₂ equivalent per annum (please note that there are 128,157 taxi vehicles affected by the traffic Law#121, and only 50,337 taxi vehicle have been replaced, representing nearly 39%. Also, there are 88,337 microbuses are affected by the law, none of which has been replaced).</td>
<td>Health: reducing the incidents of chronic and respiratory diseases in the GCR. Learning: promoting the concept of the vehicle life-cycle, and increasing the public’s awareness of environmental responsibility. Welfare: improving the quality of taxi service; improving the traffic flow and safety (by reducing road traffic fatality), and achieving sustainability of taxi business (e.g., improving the net income of taxi owners and alleviating poverty, improving the work conditions; and providing financial protection against the risk of physical damage, fire and theft, and also against liability).</td>
<td>-Growth: creating more job opportunities especially in the auto industry* and recycling; promoting important financial concepts (banking and insurance); improving the civilizational image and promoting tourism. This increases the GDP. -Cost reduction: reducing fuel subsidies (only after being able to improve the income of the owners of the aging fleet); and limiting the cost-burden on the government by structuring the program as public-private partnership (PPP). Also registering the NPVR as a CDM transport project constitutes an important additional revenue source that makes the program economically more attractive (please recall the CERs discussed in table 2.11). -Balance of payments: reducing the amount of steel imported, and thus reducing the use of foreign exchange.</td>
</tr>
<tr>
<td>Conservation: reducing the annual fuel consumption (and reducing the rate at which the petroleum, a natural resource, is depleted). Also, encouraging the use of natural gas which is more efficient than petrol reduces the annual fuel consumption, known as better protection and management of resources.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the International Level

-Global warming potential (GWP): the initial CAPs will have a very modest impact in terms of the GWP (please recall that the initial CAPs will only reduce emissions by 20 metric tons of CO₂-equivalent per year). However, as the PoAs has a life cycle of 28 years, and more CAPs will be added in the future, it is estimated that the NPVR will have a higher GWP. -Innovative methodology and PPP: the success rate of submitted CDM transport methodologies is significantly low (as mentioned in table 2.11). Before the NPVR there were only two CDM transport projects registered worldwide, and none of them was a PoAs, or even a small scale project. The project developers, with the collaboration of international bodies, have been able to develop the first PoAs’ methodology in the transport sector worldwide. That is why the program is getting more international recognition, and governments in Yemen, Morocco, and Mexico have all expressed interest in launching similar programs. Thus, these innovative methodology and program scheme will have critical implication for developing countries, having a similar context and sustainable development objectives. Thus, it is expected that the GWP when implementing the success story in several developing countries will be high.

Table 2.20: The Benefits of the NPVR

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>Air quality; improving air quality by reducing the emission loads in the GCR (one of the most polluted megacities in the world). This is achieved by replacing the high emitters (aging vehicles) with low emitters, and also by encouraging the use of natural gas (environmentally clean fuel). This is also known as reducing negative externalities. The initial CAPs are estimated to reduce 20 metric tons of CO₂ equivalent per annum for 10 years (the CAPs cycle). As the NPVR is PoAs, the addition of more CAPs covering taxis and microbuses in the other Egyptian regions will significantly increase the annual reduction in CO₂ equivalent per annum (please note that there are 128,157 taxi vehicles affected by the traffic Law#121, and only 50,337 taxi vehicle have been replaced, representing nearly 39%. Also, there are 88,337 microbuses are affected by the law, none of which has been replaced).</td>
</tr>
<tr>
<td>Social</td>
<td>Health: reducing the incidents of chronic and respiratory diseases in the GCR. Learning: promoting the concept of the vehicle life-cycle, and increasing the public’s awareness of environmental responsibility. Welfare: improving the quality of taxi service; improving the traffic flow and safety (by reducing road traffic fatality), and achieving sustainability of taxi business (e.g., improving the net income of taxi owners and alleviating poverty, improving the work conditions; and providing financial protection against the risk of physical damage, fire and theft, and also against liability).</td>
</tr>
<tr>
<td>Economic</td>
<td>-Growth: creating more job opportunities especially in the auto industry* and recycling; promoting important financial concepts (banking and insurance); improving the civilizational image and promoting tourism. This increases the GDP. -Cost reduction: reducing fuel subsidies (only after being able to improve the income of the owners of the aging fleet); and limiting the cost-burden on the government by structuring the program as public-private partnership (PPP). Also registering the NPVR as a CDM transport project constitutes an important additional revenue source that makes the program economically more attractive (please recall the CERs discussed in table 2.11). -Balance of payments: reducing the amount of steel imported, and thus reducing the use of foreign exchange.</td>
</tr>
</tbody>
</table>

Source: The World Bank (2010a); CDM.UNFCCC (2011); Kfw-Entwicklungsbank (2008); ESMAP (2010); Danish Energy Agency (2011).

* It was mentioned previously that the capacity utilization for the domestic auto manufacturers was low. At present, car manufacturers have increased production to three shifts a day to increase production by 50 to 60 percent more (MOF, 2009a).
2.4 Summary

The aim of this chapter is to describe the context in which the empirical study will be undertaken. It includes three sections. Section one provides key data about Egypt. It also shows that Egypt is classed as a lower middle income country, and the Egyptian economy is described as emerging. Section two overviews the Egyptian banking sector. It shows that commercial banks are the dominant financial institutions in Egypt, and the public sector banks dominate the banking sector, having a high market share in terms of total assets, total deposits, and total loans. It also shows that the retail banking concept, to some extent, and the SMEs concept, to a great extent, are not well established. This section also presents the rationale and justification for choosing the Egyptian commercial banks as the field of investigation. Although the banking sector is chosen as the field of investigation, it is essential to review the context of the NPVR in which some national and international banks played key roles (please recall section 1.7). Thus, section three reviews the context before implementing the NPVR (the baseline context), provides a snapshot for the NPVR, and lists the key benefits of this program (and as such its impact on the baseline context). During this section, the relevant literature is reviewed. Also, a stylized owner spreadsheet model is developed to examine the replacement problem of a profit-maximizing vehicle owner.

In Chapter 3, I will present and discuss several scholars’ views of innovation. Moreover, I will discuss three issues featuring the majority of past innovation typologies, and identify the most powerful approach intended to overcome these issues.
Chapter 3 Innovation Approaches and Typologies

The aim of this chapter is to present and discuss two critical aspects of any innovation study: innovation views and approaches; and innovation typologies. The chapter is organized in three main sections. In section one, I will present and discuss several views, approaches, and definitions of innovation. Moreover, I will place the current research project within the process stream of innovation research. In section two, I will highlight several issues of past conceptual and empirical research in innovation typologies. I will suggest the Characteristics-based Approach to innovation and technical change to overcome these issues. I will present an updated version of its two theoretical parts: the characteristics-based representation of a product; and innovation modes. I will conclude this section by identifying the advantages of this approach. In section three, I will present a summary of the chapter.

3.1 Several Views and Approaches of Innovation

In an inquiry into service innovation, the starting point should rest with a definition of the term innovation. While, on the most basic level, innovation means something new, the literature does not demonstrate unanimous agreement of a detailed definition because the innovation phenomenon has been studied by scholars within different research fields (e.g., economics, technology management, and sociology). Scholars within these fields have tended to share a set of assumptions regarding three dimensions: (1) the stage of innovation process (innovation generation, and/or innovation adoption); (2) the level of analysis (e.g., industry-level, organizational-level, or subunit-level); and (3) the types of innovation (e.g., product vs. process, radical vs. incremental, technical vs. administrative) (Gopalakrishnan and Damanpour, 1997; Wolfe, 1994).

Economists view innovation as a fundamental phenomenon that brings large changes in the productivity at the industry level, and causes economic development and growth. Thus, economists most likely focus on the generation stage of radical innovations that occurs within the technical systems of organizations. Technologists are only concerned with the generation of new technology and improving upon existing technology. They are mainly interested in addressing technical, radical and incremental, product and
process innovations. Technologists and economists are similar in that they both study product and process innovations and address only technical innovations. However, unlike economists, they consider both radical and incremental shifts in technology. Technologists may be divided into two types: “contextual technologist”; and “organizational technologists”. The former type is concerned with the nature, generation, and dynamics of technological change within the context of the industry in an attempt to aid firms trying to manage technological transitions. The latter is concerned with the factors that influence the generation and adoption of technological innovation at the level of organizational sub-units (e.g., R&D and manufacturing).

Sociologists, on the other hand, have been mainly interested in studying innovation at the organizational level. They have been mainly interested in product and process, technical and administrative, radical and incremental innovations (Damanpour and Wischnevsky, 2006; Garcia and Calantone, 2002; Gopalakrishnan and Damanpour, 1997: 20-21; Lazonick, 1994).

Within the sociology field, however, innovation has been viewed quite differently. Some scholars have recognized the divergent characteristics of organizational innovation research, and sought to structure this research into a set of recognizable research approaches (or streams). Of particular importance are: (1) “variance research” (also known as “organizational innovativeness” research or the “outcome approach”); and “process” research. While variance sociologists focus on studying innovation as a discrete phenomenon, product, or outcome (e.g., new idea or method), process sociologists view innovation as a continuously evolving process (the process of introducing something new). Thus, each approach has different foci as “each addresses a different question, has a different unit of analysis, and a different dependent variable”. It is strongly recommend that innovation scholars need to appreciate the differences among these two streams as the lack of this appreciation will lead to: distracting the researcher’s attention from issues which are central to a study; and confusion regarding the state of development of the field (Gopalakrishnan and Damanpour, 1997; Van de Ven and Poole, 2005; Wolfe, 1994: 407). Table 3.1 lists several definitions introduced by several scholars within the previous three fields of study, while table 3.2 summarizes the main differences among these fields. (Please note that, in table 3.2, I will emphasize the difference between variance and process theory research.)
Innovation is defined as “new combination of existing knowledge”. It is the cumulative nature of knowledge that leads to technical revolution. Innovation includes five types: (1) product innovation; (2) process innovation; (3) market innovation; (4) input innovation; and (5) organizational innovation. The continuous introduction of these five types causes the process of creative destruction.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economists</strong></td>
<td></td>
</tr>
<tr>
<td>Schumpeter (1934: 66-68; 1942)</td>
<td>Innovation is defined as “new combination of existing knowledge”. It is the cumulative nature of knowledge that leads to technical revolution. Innovation includes five types: (1) product innovation; (2) process innovation; (3) market innovation; (4) input innovation; and (5) organizational innovation. The continuous introduction of these five types causes the process of creative destruction.</td>
</tr>
<tr>
<td><strong>Technologists</strong></td>
<td></td>
</tr>
<tr>
<td>Garcia and Calantone (2002: 112)</td>
<td>Technological innovation is defined as an “iterative process” of development, production, and marketing tasks that is initiated by a perception of a new opportunity driven by “technology-based invention”, and strives to put the new opportunity successfully to commercial ends to add economic value to the firm.</td>
</tr>
<tr>
<td>McDermott and O’Connor (2002: 424)</td>
<td>Innovation is defined as “a new technology or [&quot;previously untried&quot;] combinations of technologies that offer worthwhile benefits”.</td>
</tr>
<tr>
<td><strong>Sociologists</strong></td>
<td></td>
</tr>
<tr>
<td>Dewar and Dutton (1986: 1422)</td>
<td>Innovation is defined as “an idea, practice, or material artifact perceived to be new by the relevant unit of adoption”.</td>
</tr>
<tr>
<td>Damanpour (1987: 676)</td>
<td>Innovation is defined as “the implementation of new idea—whether pertaining to device, system, process, policy, program, or service—that is new to the organization at the time of adoption”. In this respect, three types of innovations are defined. These are: technological innovations (e.g., the introduction of a new product, service, or production process as a result of the use of a new tool, technique, device, or system); administrative innovations, also known as “organizational structure innovations” and “people innovations” (the implementation of an idea that changes the organizational structures and/or the administrative processes, e.g., job rotation); and “ancillary innovation” (“organization-environment boundary innovations”, e.g., marketing innovations).</td>
</tr>
<tr>
<td>Damanpour (1991: 556)</td>
<td>Innovation is defined as “adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization. . . . [Thus] innovation is a means of changing an organization, whether as a response to changes in its internal or external environment [reactive innovation] or as a preemptive action taken to influence an environment [proactive innovation]”.</td>
</tr>
<tr>
<td>de Brentani (2001: 170)</td>
<td>Innovation is defined as “the creation of a new product, service, or process”.</td>
</tr>
<tr>
<td>Camacho and Rodriguez (2005: 261)</td>
<td>Innovation is defined as “as a new or significantly improved product (good or service) introduced to the market (product or service innovation) or the introduction within the firm of a new or significantly improved process (process innovation)”.</td>
</tr>
<tr>
<td>Dibrell et al. (2008: 205)</td>
<td>Innovation is defined as “any idea, practice, or object that the adopting individual or organization regards as new”.</td>
</tr>
<tr>
<td>Amara et al. (2009: 407)</td>
<td>Innovation is defined as “a change of business by the addition of a new element or a new combination of old elements in the Schumpeterian meaning. . . . More precisely, we hypothesise that service innovation results from the creation of new combinations of knowledge”. Innovation, thus, includes six types: product innovation (introducing new or significantly improved products to the market); process innovation (introducing new or significantly improved production process); delivery innovation (introducing new or significantly improved delivery process); strategic innovation (implementing new or significantly modified business strategies and missions, e.g., developing new business models); managerial innovation (implementing new or significantly modified managerial techniques, e.g., quality circles); and marketing innovation (implementing new or significantly modified marketing strategies and methods).</td>
</tr>
<tr>
<td>den Hertog et al. (2010: 494)</td>
<td>Service innovation is “a new service experience or service solution that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system/business partners, new revenue model, new organizational or technological service delivery system”.</td>
</tr>
<tr>
<td><strong>Process Sociologists</strong></td>
<td></td>
</tr>
<tr>
<td>Van de Ven (1986: 591)</td>
<td>Innovation is defined as “the development and implementation of new ideas by people who over time engage in transactions with others within an institutional context”. This definition is “sufficiently general to apply to a wide variety of technical, product, process, and administrative kinds of innovations”.</td>
</tr>
<tr>
<td>Lazonick (1994: 247)</td>
<td>Innovation is defined as “social process that requires the conscious involvement . . . of many people with a variety of specialized skills and functions.”</td>
</tr>
</tbody>
</table>
Chapter 3 Innovation Approaches and Typologies

Innovation requires collective organization because it is complex, cumulative, and continuous”. It is an “evolutionary process”.

Innovation is defined as “any change [in the “evolutionary” sense] affecting one or more terms of one or more vectors of characteristics (of whatever kind—technical, service, or competence). These changes are brought about by a range of basic mechanisms: evolution or variation, disappearance, appearance, association, dissociation. They may be ‘programmed’, i.e., intentional, the product of R& D, design and innovation activity, or ‘emergent’, i.e., the fruit of natural learning mechanisms”.

**Table 3.2: A Comparision among Several Views and Approaches of Innovation**

<table>
<thead>
<tr>
<th>View (and Approach)</th>
<th>The Stage of Innovation</th>
<th>The Level of Analysis</th>
<th>The Types of Innovation</th>
<th>Central Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economists</strong></td>
<td>-Generation.</td>
<td>-Industry.</td>
<td>-Product and process.</td>
<td>-NA.</td>
</tr>
<tr>
<td><strong>Technologists</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contextual Technologists</td>
<td>-Generation.</td>
<td>-Innovation (in the industrial context).</td>
<td>-Product and process.</td>
<td>-NA.</td>
</tr>
<tr>
<td>Organizational Technologists</td>
<td>-Generation and adoption.</td>
<td>-Organizational sub-units</td>
<td>-Product and process.</td>
<td>-NA.</td>
</tr>
<tr>
<td><strong>Sociologist</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance Sociologits</td>
<td>-Adoption (but recent calls have been made to include generation).</td>
<td>-Organization</td>
<td>-Product and process.</td>
<td>-Innovation is studied as a discrete phenomenon, product, or outcome (static view).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Technical and non-technical.</td>
<td>-Address the determinants (causes or correlates) of innovativeness of organization and/or the distinct features compatible with the adoption of different types of innovations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Radical and incremental.</td>
<td>-Time ordering among independent variables is immaterial.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Emphasis on immediate causation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Employ survey research designs.</td>
</tr>
<tr>
<td>Process Theory Sociologists</td>
<td>-Generation and adoption.</td>
<td>-Innovation process (in the organizational context)</td>
<td>-Product and process.</td>
<td>-Innovation is studied as a an evolving process (dynamic view).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Technical and non-technical.</td>
<td>-Investigate the nature of the innovation process (how and why innovations emerge, develop, grow, and (perhaps) terminate over time).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Radical and incremental.</td>
<td>-Time ordering of independent events is critical.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Explanations are layered and incorporate both immediate and distal causation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Employ in-depth longitudinal research design.</td>
</tr>
</tbody>
</table>

Considering tables 3.1 and 3.2, the classic work of Schumpeter (1934; 1942: 82) is given as an example that represents the economist view of innovation. He views innovation as the fundamental phenomenon of economic development. He states that the continuous introduction of several types of innovation represents “a process of industrial mutation . . . that incessantly revolutionizes the economic structure from within, incessantly destroys the old one, incessantly creates new one. This process of Creative Destruction is the essential fact about capitalism”. He views the innovation process as being increasingly more institutionalized and depersonalized. He also acknowledges the cumulative nature of knowledge that leads to technical revolution. Despite the fact that he is an economist, he introduces a wide and open definition (covering technical and non-technical innovation), and thus has remained the best reference for many innovation scholars within different fields. The work of Garcia and Calantone (2002) is given as an example that captures the contextual technologist view of innovation, who is concerned with the nature and dynamics of technical change within the context of the industry. Thus, they elaborate on the dynamic theory of industrial innovation life cycle developed by Utterback and Abernathy (1975), when studying the iterative process of technological innovation on the firm (micro) level within the industry (macro) context. The work of McDermott and O'Connor (2002: 424) is given as an example that represent the organizational technologist view of innovation. They are mainly concerned with the the factors that influene: the generation of technological innovation at the level of one organizational unit (e.g., R&D and innovation hubs); and the adoption of this technological innovation by another orhanizational unit receivng the innovation (manufacturing).

Several definitions are given as examples that represent the the quite different views of variance and process sociologists to innovation. While both types of sociologist study both technical and non-technical innovation, they study the phenomenon of organizational innovation in a quite different way. Variance sociologists view innovation as a discrete phenomenon (outcome), employ a static methodology (survey design), seek to identify the key determinates (causes or correlates) of organizational propensity to innovate, and whether there are distinct factors compatible with different types of innovation. Thus, vairnace sociologists address the determinants of the innovativness of organizations by investigating contextual, strucutral, and behavioural characterisitcs, differentiating the innovative from non-inovative organizations. Process sociologists, on the other hand, view innovation as an evolutionary process, being:
social or collective, institutionalized; complex due to the multiplicity of interactions between several agents within the organization; path-dependent due to the cumulative nature of learning. Thus, they employ in-depth longitudinal methodology, and seek to identify “fundamental laws of innovating useful for explaining a broad class of processes, sequences, and performance conditions unfold along the innovation journey”. They seek to explain “the temporal order and sequence of steps that unfold as an innovative idea is transformed and implemented into a concrete reality”. Thus, this approach investigates encompassing problems that have been largely overlooked by the variance research. Moreover, in addition to representing the innovation journey as a linked chain of phases and steps, it is also possible to represent the innovating firm as a linked chain of capabilities and competences (Damanpour and Wischnevsky, 2006; Gallouj and Weinstein, 1997; Gopalakrishnan and Damanpour, 1997; Lazonick, 1994; Van de Ven, 1986; Van de Ven and Poole, 1990: 313; 2005; Wolfe, 1994).

All in all, although innovation has been viewed, conceptualized, and defined differently, it has been possible to categorize past research into few set of homogeneous views. In this respect, several points need to be made explicit before concluding this section. First, several fields have contributed to the study of (and enriched our understanding to the phenomena) of innovation. Thus, innovation in general and radical innovation in particular is considered as an inter-disciplinary subject, and the study of innovation requires what is called the triangulation of theories. Second, as I adopt a processual worldview and seek to build theory, the current research project belongs to the Process Theory (PT) stream of research. Third, the issues that are conceived to be central by variance sociologists are different from the ones conceived to be central by process sociologists. Despite this, both approaches complement each other. Fourth, process research owes much from Schumpeter (1934, 1942), Penrose (1959), and evolutionary economics (explained in section 3.3.1.1). In other words, dynamic theories have very critical implications for the current research project. Fifth, I will suggest the following working definition for innovation: Innovation may be defined as a process that involves accumulating, bundling, institutionalizing, and maintaining the organizational capabilities and competences that lead to the generation of sustainable competitive advantage through the introduction of new products/services (product/service innovations) and new technical processes (process innovations). This definition is believed to be sufficiently general to cover the wide scope of the current research inquiry (LI, LII, and LIII). It reflects a processual worldview, and is introduced
in terms of capabilities and competences that could be concluded from phases and steps. It also shows that the focus of the current research project is product/service and process innovation. Having presented and discussed several views of innovation, and situated the current research project within the PT stream of innovation research, I will move now to presenting and discussing another critical aspect of any innovation study, innovation typology.

### 3.2 Types of Innovation

Madhavaram and Hunt (2008: 68) state that “classificational schemata” are essential when developing theory as they are the primary means for organizing phenomenon into classes that are amenable to systematic investigation. In this respect, many classifications have been introduced in the NPD and NSD literature. For example, several scholars have introduced dichotomous categorization: new vs extension; radical vs incremental; discontinuous vs continuous; and revolutionary vs evolutionary. Others have introduced triadic-categorization: (1) highly innovative, (2) moderately innovative, (3) low innovative; and (1) radical, (2) architectural, (3) incremental. Still others have introduced tetra-categorization: (1) radical, (2) architectural, (3) modular, (4) incremental; (1) breakthrough, (2) fusion, (3) architectural, (4) incremental; (1) architectural, (2) niche creation, (3) revolutionary, (4) regular; (1) radical, (2) technological breakthrough, (3) market breakthrough, (4) incremental; and (1) radical, (2) really new, (3) incremental, (4) imitative (Abernathy and Utterback, 1988; Chandy and Tellis, 1998; Danneels, 2002; Ellonen, et al., 2009; Garcia and Calantone, 2002; Gatignon et al., 2002; Green and Gavin, 1995; Henderson and Clark, 1990; Markides, 2006; Markides and Geroski, 2005; McDermott and O'Connor, 2002). Still other scholars have introduced five and six categories: (1) radical innovation, (2) large incremental innovation, (3) small incremental innovation, (4) general acts of learning, (5) individual acts of learning (Sundbo, 1997); (1) new to the world products, (2) new to the company products (new product lines), (3) additions to existing product lines, (4) improvements in (revisions to) existing products, (5) repositioning, and (6) cost reductions (Griffin and Page, 1996); (1) new to the market services, (2) new to the company services, (3) new delivery processes, (4) service modifications, (5) service line extensions, and (6) service repositioning (Avlonitis et al., 2001).
3.2.1. Issues of Innovation Typologies

Garcia and Calantone (2002: 118) critically review many of the (technological) innovativeness typologies, and as such their work is of particular importance. They find that there is a lack of consistency among most classification schema, due to ambiguity, in a way that makes it “impractical, if not impossible, to accurately compare research results”. In this respect, they use two innovations (moving from the manual typewriter to the electric one, and moving from the analog photocoper to the digital one) to show how these two innovations are classified differently along several typologies introduced by notable scholars within innovation research. That is the typewriter innovation, for example, could be classified as radical (revolutionary) innovation along one typology, moderate innovation along another typology, and incremental innovation along a third typology. Moreover, they review a large number of empirical studies, which examine the moderating or mediating effects of product innovativeness, or modeled it as dependent variable. In this respect, they find that “inconsistencies also plague the operationalization of product innovativeness in empirical literature”. Moreover, they find that a large number of innovations are misclassified as radical or incremental innovations although these innovations should be classified as really new innovations, a moderately innovative class that lies in between the two extremes. In a similar vein, Dahlin and Behrens (2005) critically review notable studies concerning radical innovation and change. They find that ambiguity of definitions and the inconsistency of operationalization are evident in these studies, in a way that does not improve generalizability across studies, and does not help in building a cumulative body of work dealing with the phenomenon.

The ambiguity and the misclassification of the degree of innovativeness highlight the need to adopt an approach that has the ability to explicitly define the current state of technology (in its wide sense that includes tangible and intangible systems), and be able to detect improvement or change (on the qualitative level). Moreover, the inconsistency of innovation typologies highlights the need that this approach needs to be general, applicable for both goods and services. Such a general approach, thus, would improve generalizability across studies, and help in building a cumulative body of work dealing with the innovation phenomenon. Gallouj and Weinstein (1997: 537) recognize the need to develop such a general approach to innovation and technical change. They argue that such an approach is particularly important for service innovation due to the issue of
measuring the degree of innovativeness in the service sector due to “the specific properties of service activities, particularly the analytically 'fuzzy' nature of their output, [which] make it particularly difficult to measure them by the traditional economic methods (productivity) and to detect improvement or change (on the qualitative level”).

This general approach to innovation and technical change has two theoretical parts. The former is characteristics-based representation of a product, in which any product (good or service) is represented as a combination of several sets of related characteristics that define the current state of technology. The latter is a set of innovation modes (typology) that capture any change in these characteristics. Thus, these modes reflect the characteristics dynamic. This approach is developed by Gallouj and Weinstein (1997), and reinforced by Djellal et al. (2003), Djellal and Gallouj (2005), de Vries (2006), and Windrum and García-Goñi (2008). The following is a presentation and discussion for each theoretical part. This section is concluded by listing the advantages of this general approach to innovation and technical change.

3.2.2 The Characteristic-based Representation of a Product

Gallouj and Weinstein (1997) elaborate on the theory of consumer behavior developed by Lancaster (1966), in which a product is defined as a set of characteristics, and the theoretical approach to the construction of technological output indicators developed by Saviotti and Metcalfe (1984) to develop a theory that explicitly takes into consideration technical changes taking place in the service context. Gallouj and Weinstein (1997) consider a product (good or service) to be represented by a set of linked vectors of characteristics ((Y) and (T)) and competences ((C) and (Ç)).

3.2.2.1 Vector (Y)

The vector (Y) represents a set of final characteristics of the product (also known as: the external or service characteristics; the core-supplementary combination of solutions, utilities, use values, benefits, or outcomes). This set of final characteristics is intended to solve a problem concerning a service medium (possessions, codified information, knowledge, and people), and, as such, to satisfy a need (de Vries, 2006; Djellal, et al., 2003; Djellal and Gallouj, 2005; Gallouj and Savona, 2009; Gallouj and Weinstein, 1997). The final characteristics, thus, is more akin to the service concept, used in the literature of NPD and NSD. To produce the vector (Y), to solve a problem regarding the
medium, the following vectors should be mobilized: vector (T), which represents the technical characteristics; vector (C), which represents the competence of the employees participating in the service production and delivery; and vector (Ć), which represents the competence of the clients (Gallouj and Weinstein, 1997).

3.2.2.2 Vector (T)

This vector represents the technical characteristics of the product, and is broken down into two sets of characteristics: (1) the “tangible technical characteristics” (e.g., information and logistical technologies, and chemical products in the cleaning services); and (2) the “intangible [or methodological] technical characteristics” (e.g., financial expertise, mathematical instruments (economic and financial modeling, operational research methods), clients’ files, procedures). The intangible technical characteristics, thus, represent systems of “codified and formalized competences” that exist independently of individuals and constitute the various elements that makeup “organizational memory” (Gallouj, 2002; Gallouj and Weinstein, 1997: 543).

Several scholars have sought to revise the conceptualization of the characteristics-based representation of a product. These attempts could be classified into: decomposing the T vector (e.g., Djellal, et al., 2003; Djellal and Gallouj, 2005; Toivonen and Tuominen, 2009); or adding new actors (e.g., de Vries, 2006; Windrum and García-Goñi, 2008). For example, Djellal et al. (2003: 418) and Djellal and Gallouj (2005) make an attempt to revise the conceptualization of vector (T) to reflect (and also to enrich) the R&D activities in the service context. They develop a “scientific and technological breakdown” to the technical characteristics (T). In this respect, a service could be thought of as “a combination of various processing or problem-solving functions” or activities, as shown in table 3.3.
### Table 3.3: A Scientific and Technological Breakdown to the Vector (T)

<table>
<thead>
<tr>
<th>Operations related to</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Possessions (M)</td>
<td>“The operations and sciences and technologies used to process material objects”, (M), operations such as transporation, transformation (e.g., scrapping and recycling), maintenance, and repair, and the associated technologies such as mechanics and robotics. These, thus, are mainly directed at physical possessions.</td>
</tr>
<tr>
<td>Intangible Assets (I)</td>
<td>“The operations and sciences and technologies used to process codified information”, (I), operations such as producing, capturing, storing, archiving, updating, and transporting, and the associated technologies such as computers, telecommunications, imaging. These, thus, are mainly directed at intangible assets (e.g., banking, insurance, and research).</td>
</tr>
<tr>
<td>People’s Mind (K)</td>
<td>“Knowledge-processing [methodological] operations and sciences and technologies”, (K), operations related to the processing of knowledge by means of methods such as codified methods and routines and intangible technologies. These, thus, are mainly directed at people’s mind (e.g., education, advertising, broadcasting, arts and entertainment).</td>
</tr>
<tr>
<td>Individuals and Relations (R)</td>
<td>“The operations and sciences and technologies used to process individuals and relations”, (R), those whose principle medium is the customer himself. These services are mainly directed at people bodies (e.g., transportation, healthcare, restaurants).</td>
</tr>
<tr>
<td>Pure Service (C)</td>
<td>“Pure” service provided directly by relying on the the vector (C), without the use of sophisticated (tangible or intangible) technical systems.</td>
</tr>
<tr>
<td>Integrating the Previous Operations (AK)</td>
<td>“The operations through which these various types of operations are combined or brought together”, architectural knowledge (AK).</td>
</tr>
</tbody>
</table>

Source: Complied from Djellal et al. (2003) and Djellal and Gallouj (2005).

I find that breaking down the vector (T) into a set of problem-solving operations is more useful than the (tangible and intangible) classification introduced by Gallouj and Weinstein (1997) for two main reasons. First, each group of operations or functions can be a locus for the development of new knowledge and thereby constitute, in a way, a separate type of R&D. This variety of disciplines involved may enable innovators to identify problems and to create solutions, innovations (Djellal, et al., 2003; Djellal and Gallouj, 2005). This has a very important implication as empirical research shows that the lack of new service opportunities in the core field is a major challenge confronting true innovators (Preissl, 1998). Moreover, the previous scientific breakdown of the vector (T) is believed to be a contribution to service innovation literature, and could correct the “clearly mistaken” idea that services conduct no R&D (Miles, 2007: 250). Second, it will facilitate integrating two well known types of knowledge, introduced within the literature of innovation and organizational knowledge. These are: core knowledge; and architectural knowledge. The core knowledge is “often scientific or technological”, and is at the heart of, and forms the foundation for a product/service. Each type of operations (and the associated technologies), thus, represents what might be called core component of knowledge. As more than one type of operations may be involved in the production of product/service, and each type represents different core component of knowledge, there will be multiple components of core knowledge that
require an architectural knowledge linking and integrating these multiple components of knowledge into a coherent whole, an architectural (Helfat and Raubitschek, 2000: 963; Henderson and Clark, 1990; Henderson and Cockburn, 1994). In short, the vector (T) encompasses multiple core components of knowledge (underlying the operations and the associated families of technologies related to M, I, K, R), and the architectural knowledge (AK) linking and integrating these multiple components into a coherent whole.

While the previous revision is related to breaking down the vector (T), other scholars have sought to add new actors to the characteristics-based representation. de Vries (2006: 1038) finds an empirical evidence that “gives rise to a revision of Gallouj and Weinstein’s theory”. In the cases studied, he finds “a pattern in which providers combine their competences [vectors (C)] and technological characteristics [vectors (T)] in a network of organizations to provide the new core-supplementary solutions [Vector (Y)]”. Thus, he suggests enhancing the presentation of a product to include other providers in the network. This, however, has two important implications. First, it implies that the architectural knowledge (AK) should be extended to include not only linking and integrating the multiple components of knowledge of one provider, but also linking and integrating the multiple components of knowledge on the network level. Second, it implies that the customer may co-produces not only with one service provider, but with several providers. In a similar vein, Windrum and García-Goñi (2008) adopt the characteristic-based approach when investigating radical innovation in the public health sector, and develop a multi-agent model that reintroduce the policy-maker as a key agent in the innovation process. It is concluded, thus, that more actors (being private firms or public sector) should be added when representing the most general representation of the product. In short, the previous two revisions have moved the characteristics-based representation from the product level to the network level.

3.2.2.3 Vectors (C) and (Ç)

These vectors represent the competences mobilized in the provision of a service, and are made up of the individuals’ competences involved in providing the service in question: vector (C) represents those of the employees participating in the production process (e.g., education, training, experience); and vector (Ç) represents those of the client, which might include tangible components (e.g., PC or Mobile phone in the banking
Figure 3.1: The Characteristics-based Representation of a Product

The previous figure (blocks 1 and 2) represents a general conceptualization of a product (on the network level) updated by incorporating the most recent enhancements suggested by recent empirical research, and also by incorporating the block of marketing needs introduced in the literature of financial services marketing. This figure shows that a product is represented by a set of final characteristics \( Y_i \). Each \( Y_i \) indicates the “level” of a characteristic \( i \). These final characteristics are obtained by a certain combination of: (1) technical characteristics \( T_j \), related to the operations and the associated families of technologies related M, I, K, and/or R in addition to the combinatory operations (AK); and (2) competences of the employees participated \( C_k \), and of the client \( C_q \) (de Vries, 2006; Djellal and Gallouj, 2005; Gallouj and Weinstein, 1997: 544; Windrum and García-Goñi, 2008).

### 3.2.3 Innovation Modes

Based on the characteristics-based representation of a product (figure 3.1), innovation is analyzed as an *evolutionary process*, and six modes of innovation are identified based
on the characteristics dynamic, and are empirically tested (de Vries, 2006; Djellal and Gallouj, 2005; Gallouj and Weinstein, 1997; Windrum and García-Goñi, 2008). Of particular importance are the following four major modes of innovation: radical innovation; ameliorative innovation; incremental innovation; and recombinative innovation. In the following, I will present and discuss this typology, and compare it with other NSD and NPD typologies. Though, I believe that this comparison will be greatly restricted due to the ambiguity and inconsistency issues identified earlier.

3.2.3.1 Radical (Discontinuous or Breakthrough) Innovation

Radical innovation have been defined in different ways. For example, Contextual technoligists adopt a restrictive definition for radical innovation. Garcia and Calantone (2002: 120) define radical innovations as “innovations that embody a new technology that results in a new market infrastructure”. Thus, radical innovation causes technological and marketing discontinuities on the macro level (being the world, a market, or an industry), which automatically causes discontinuities on the firm and customer level. In other words, radical innovation either disrupts or completely destroys the established practices, which requires accumulating new technical and marketing knowledge bases. In the same vein, Geels (2002: 1259) states that, in radical innovations, “markets are simply assumed to be ‘out there’. For radically new technologies, however, there are no established markets . . . . Radically new technologies, markets . . . co-evolve”. Garcia and Calantone (2002) contend that discontinuous (breakthrough) innovation may be radical innovation or really new innovation. A discontinuous innovation will be radical only if it causes both technical and marketing discontinuities on the macro level. On the other hand, a discontinuous innovation will be really new innovation if only one discontinuity (technical or marketing) on the macro level exists.

Contrary to the previous scholars who adopt a restrictive definition for radical innovation, other scholars argue that radical innovation may only cause technical discontinuity. For example, Leifer, et al. (2000), Rice et al. (2001), McDermott and O'Connor (2002), O'Connor et al. (2002), and O'Connor and DeMartino (2006) define radical innovation as one with the potential to achieve one or more of the following: (1) an entirely new set of performance features; (2) improvements in known performance features of 5-10x or greater; and/or (3) a significant reduction in cost, 30-50% or
greater. Then, they argue that radical innovation may be: (1) innovation in the white spaces between firm’s existing businesses; or (2) innovation within the technology/market domains of existing business units. In the former, radical innovation causes both technical and marketing discontinuities as the radically new products serve new markets. In the latter, however, radical innovation only causes technological discontinuity as its aim is to replace existing technologies for essentially familiar markets (the same customers and markets). This type of radical innovation has a very low level of marketing uncertainties (e.g., limited to overcoming market resistance to the new technology) as the infrastructure for contracting customers, understanding markets, and delivering the innovation are assumed to be well understood. In this type, critical management issues involve “cannibalization of current lines of business, and technological uncertainty in both development and production”. In short, radical innovation projects do not operate constantly in the space of high market, high technology uncertainty.

The characteristics-based approach is consistent with the previous argument, though it provides more clarification by representing innovation in terms of characteristics. Two definitions for radical innovation are identified: radical innovation in the narrow (strict) sense; and radical innovation in the wide sense. Radical innovation, in the narrow sense, involves “the creation of a totally new product”. It implies changing the entire system of characteristics and competences. More precisely, a new vectors of competences, technical characteristics, and service characteristics [(C*)(C*)(T*)(Y*)] is created that has no element in common with any existing system. In this respect, the more radical the innovation is, the more change is applied to the entire system, including the vectors of competences. Designing and marketing care and assistance products by insurance companies is a case in point. In many cases, however, the term radical innovation is also applied to those innovations that replace the “internal structure”, all the [(C)(C)(T)] or its equivalent, by a new one [(C*)(C*)(T*)] even it leaves the service characteristics (Y) unchanged (to a certain extent), at least in absolute terms. It is rare, however, for the “levels” not to change at all. The transition from horse-drawn carriages to motor vehicles is a case in point. Although it was considered as a radical innovation, the service characteristics remained the same to a certain extent. That is “individuals were still transported with certain degrees of comfort, safety, and speed” (Gallouj, 2002; Gallouj and Weinstein, 1997: 547).
Three important notes need to be made regarding radical innovation. **First**, as radical innovation causes, at least, technological discontinuity, it will have shallow existing technical knowledge base. Thus, the developing units or teams (e.g., R&D) will require building new knowledge base. This has critical implication for the learning mode required to build the new knowledge base. Several concepts have been introduced to describe this mode of learning. Examples are: “exploration of new possibilities” (March, 1991: 71); “long-jump” (Levinthal, 1997: 938); “double-loop learning” (Argyris, 1999: 70); “step-functional learning” (Helfat and Raubitschek, 2000: 966); “explorative innovation strategy” (He and Wong, 2004: 484); and “competence exploration” (Atuahene-Gima, 2005: 61). Exploration includes things captured by terms such as search, variation, risk taking, experimentation, flexibility, and discovery (March, 1991). **Second**, there is a consensus in the literature that radical innovation establishes a new “dominant design” (a stable set of new technical characteristics (T*)). In other words, the multiple components of knowledge underlying the operations and associated technologies are new, in addition to the architectural knowledge linking and integrating these multiple components of knowledge into a coherent whole. **Third**, the creation of new dominant design destroys the established practices, and the usefulness of existing competences: (1) the organizational competences (the manifestation of the two types of knowledge); (2) the employees’ competences (C); and the customers’ competences (Ç). Thus, this mode is described as a “competence destroying” mode of innovation (Abernathy and Clark, 1988; Anderson and Tushman, 1990; Dahlin and Behrens, 2005; Gallouj and Weinstein, 1997: 547, 554; Gatignon, *et al.*, 2002; Henderson and Clark, 1990; Windrum and García-Goñi, 2008).

The notion that radical innovation destroys the existing competences requires more clarification. Recent service innovation research has shown that there is a pattern in which a network of (private and public) entities cooperates to offer a bundle of final services (Y) through the introduction of a bundle of services and goods (de Vries, 2006; Windrum and García-Goñi, 2008). Thus, radical innovation may have different impacts on the nodes of this network. This effectively captures what Afuah and Bahram (1995: 57) call “the hypercube of innovation”. They argue that past research has tended to analyze the impact of radical innovation on the established competences of the innovating entity, while ignoring the impact of this innovation on the established competences of other suppliers and partners participated in the newly created value chain. However, based on anecdotal examples, they argue that while an innovation may
be considered as radical at the innovator level, it may turn out to be incremental at the supplier level, and architectural at the partner level. Thus, radical innovation may have different impacts on different stages of the innovation value-added chain, and this depends on the familiarity with the technology and market to a node within the value chain, which in fact has not been investigated. They state that, in some cases, an innovation may destroy the competences of all stages in the value chain (business model). They describe this as radical innovation in the “red zone”.

### 3.2.3.2 Improvement Innovation

This type of innovation is also known as product improvement or enhancement. It is more akin to trivial innovations (Desai and Low, 1987); minor improvement innovation (von Hippel, 1988); general acts of learning (Sundbo, 1997); and service improvement, modest changes in performance of the existing core product and/or supplementary services (Lovelock and Wirtz, 2007). Improvement innovation, does not, in any way, change the structure of the system \([C(T)(Y)]\), but it implies an increase in the value or weight (or quality) of certain positive service characteristics \((Y_i)\). It may also go in the opposite direction by reducing negative characteristics (externalities). This improvement can be produced by improving either certain competence \((C_p)\), or certain technical characteristic \((T_j)\). Examples of ameliorative innovation are improving the waiting time at the counter in a commercial bank, and improving the time taken to pay compensations in the event of loss or damage in an insurance company (Gallouj, 2002; Gallouj and Weinstein, 1997). Three important notes need to be made regarding improvement innovation. First, the learning mode required to introduce this type of innovation is described as being “smooth continuous learning”, that normally accompanies any activity. Second, the improvement in the product takes place continuously, due to the learning effects. Thus, this mode describes a “narrow definition” of improvement than innovation in the strict sense of the term. Third, this is “a competence enhancing” form of innovation (Gallouj, 2002: 73; Gallouj and Weinstein, 1997; Sundbo, 1997).

### 3.2.3.3 Incremental Innovation (Addition or Substitution of Characteristics)

Incremental innovation is more akin to “additions to existing product lines”, new products that supplement a company's established product lines (Griffin and Page, 1996:
In this mode of innovation, although the general structure of the system \([(C)(C)(T)(Y)]\) remains the same, it is changed marginally through the addition of new elements to (or substitution or elimination of existing elements within) vectors \(Y\) and/or \(T\). It may involve the addition of one or two new (core or supplementary) characteristics to the vector \(Y\) by mobilizing certain competences within the vector \(C\), or adding new technical characteristics to the vector \(T\). It may also involve the improvement of certain final characteristic \((Y_i)\) (or a reduction in the production cost) by adding or changing certain technical characteristic \((T_j)\) (Gallouj and Weinstein, 1997). An example is the telephone companies which have introduced “value-added services” such as call waiting and call forwarding. Such mode of innovation introduces “new dimensions into the positioning equation” that competitors cannot immediately match. Successful incremental innovators, thus, may “differentiate themselves by altering typical characteristics of their respective industries to their competitive advantage” (Lovelock and Wirtz, 2007).

Figure 3.2 represents an example of this mode of innovation.

**Figure 3.2: An Example of Incremental Innovation**

Five important notes need to be made regarding incremental innovation. First, several concepts have been introduced to describe the mode of learning required to introduce this type of innovation. examples are: “exploitation of old certainties” (March, 1991: 481); or “product-line extensions” (Lovelock and Wirtz, 2007).
Local search in the immediate neighborhood” (Levinthal, 1997: 937); “single-loop learning” (Argyris, 1999); “incremental learning” (Helfat and Raubitschek, 2000: 966); “exploitative innovation strategy” (He and Wong, 2004: 484); and “competence exploitation” (Atuahene-Gima, 2005: 61). Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, and execution (March, 1991). Second, incremental innovations refine, elaborate, and extend the established dominant design (Anderson and Tushman, 1990; Henderson and Clark, 1990). From an evolutionary perspective, these innovation modes are critical to create variety, extend the dominant design, and enhance the fitness (degree of adaptation or suitability) of the radical innovation to its environment (Gallouj, 2002). Third, as the firm “evolves”, new optional service characteristics (or “modules”) are added to the basic service. Fourth, both improvement and incremental innovations involve improvement. Thus, a distinction needs to be made. In the former, the improvement in the product takes place continuously due to the smooth continuous learning. In the latter, the improvement in the product takes place discontinuously (bit-by-bit) due to the incremental learning obtained through deliberate innovation activities that seek to create and/or acquire new knowledge. In this respect, the improvement in the incremental mode is often formalized as a new specification, option, or guarantee (Gallouj and Weinstein, 1997: 549).

Fifth, scholars who strictly adopt the Schumpeterian view of innovation do not count new to the firm as incremental innovation. In other words, incremental innovation is a new product on a more macro level than the firm. For example, Garcia and Calantone (2002) make a distinction between incremental innovations and “imitative innovations”, which I find very useful for a study adopting a measure for technical change. They state that imitative products are frequently new to the firm, but not new to the market. As such, these products usually have low degree of technological and market innovativeness, and should not be treated as incremental innovations. In other words, an incremental innovator is the first to introduce, for example, a new characteristic, and followers, introducing the same product, are imitators. Moreover, Drejer (2004) state that we need to differentiate between the first-mover and followers although the existence of both represents an essential feature of innovation. The former is seen as the entrepreneur that leads others in the same branch to follow (e.g., the innovation gets diffused through imitation). In the same vein, Toivonen and Tuominen (2009: 893) argue that “we should exclude ‘new to a firm from the definition of innovation, because
it leads to the strange conclusion that backward companies make innovations when they adopt well-known practices”. Thus, the analysis of the degree of the newness should be started in “a broader context—e.g. in a geographical or sectoral context”. In other words, “incremental innovations could be characterized as new to a region or a nation or new to a sector”. In fact, very few studies (e.g., Kimberly and Evanisko, 1981) have followed this logic by defining innovation in relation to an external standard, rather than defining it on the company level and based on the company perception.

### 3.2.3.4 Architectural (Recombinative) Innovation

As stated by Henderson and Clark (1990), the essence of this mode is to reconfigure the existing architecture to link together existing core components of knowledge in a new way. When doing so, this mode leaves the existing core components of knowledge of the product untouched. In the same vein, Gallouj and Weinstein (1997: 550) state that architectural innovation “exploits the possibilities opened up by new combinations of various final and technical characteristics [(Y) and (T)], derived from an established stock of knowledge”. It is based on “the systematic reuse or ‘recycling’ of existing ‘components’ or characteristics”. This mode of innovation involves two forms: bundling (combining or associative) innovation; and unbundling (splitting, dissociative, or fragmenting) innovation. The former involves “the creation of new product by combining the characteristics of two or more existing products”. The latter involves “the creation of new products by splitting up an existing product, separating out various characteristics and turning certain elements into autonomous products”. Figure 3.3 shows an example of bundling innovation.

**Figure 3.3: Bundling Innovation**

![Diagram of Bundling Innovation]

Several notes should be made regarding the architectural mode. First, the process of architectural innovation should not be reduced to a simple engineering exercise that involves the mere assembly of spare parts. In fact, it requires a special type of learning. It is the learning through exploration in designs, which includes finding alternative configurations of (new ways of linking and integrating) the established set of core components of knowledge. However, learning about changes in the architecture is unlikely to occur naturally. In fact, it requires the assimilation of new knowledge, and organizational mechanisms that encourage the exchange of information across “components boundaries” (or the product value chain) within the firm (Gallouj and Weinstein, 1997; Helfat and Raubitschek, 2000; Henderson and Clark, 1990; Henderson and Cockburn, 1994: 67). Second, while this mode of innovation preserves the core components of knowledge, it destroys the architectural knowledge. As a result, this mode both enhances and destroys the existing competences. As such, it presents subtle challenges for established firms as architectural knowledge is embedded in the practices, procedures, and routines of these established firms (Henderson and Clark, 1990; MacMillan et al., 1985). Third, the implementation of this mode in the service context is based on an important presupposition. It requires a greater degree of formalization of existing activities (e.g., “the development of standardized products and modulization of service production”), that facilitates designing a certain type of “modular architecture” for both products and production systems (Gallouj and Weinstein, 1997: 552). Fourth, in some cases, bundling innovation may lead to the creation of totally new product (radical innovation) if the recombined technical characteristics are “sufficient to make possible totally new modes of use”. This, however, may require bringing different actors and firms together, in one network of providers (de Vries, 2006; Gallouj and Weinstein, 1997: 551). A comparison among these four major modes of innovation is presented in table 3.4.
Table 3.4: A Summary of the Features of Four Major Innovation Modes

<table>
<thead>
<tr>
<th>Factors</th>
<th>Radical (Discontinues) Innovation</th>
<th>Improvement Innovation</th>
<th>Incremental Innovation</th>
<th>Architectural Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning nature</td>
<td>- Learning through exploration (also called: “exploration of new possibilities”(^2); “long-jump”(^2); “double-loop learning”(^3); “step-functional learning”(^3); “explorative innovation strategy”(^5); and “competence exploration”(^5)). - Exploration includes things captured by terms such as search, variation, risk taking, experimentation, flexibility, and discovery(^1).</td>
<td>- Smooth continuous learning that accompanies any activity(^7). (^8).</td>
<td>- Learning through exploitation (also called: “exploitation of old certainties”(^1); “local search in the immediate neighborhood”(^2); “single-loop learning”(^3); “incremental learning”(^4); “exploitative innovation strategy”(^5); and “competence exploitation”(^5)). - Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, and execution(^1).</td>
<td>- Learning through exploration in designs, and the assimilation of new knowledge. - Exploration in design includes finding alternative configurations of (new ways of linking and integrating) the established set of core components of knowledge(^2)(^10). - Learning about changes in the architecture is unlikely to occur naturally(^9).</td>
</tr>
<tr>
<td>Nature of the actions on characteristics</td>
<td>- Narrow definition: the creation of a new set of characteristics ([C^<em>)(C^</em>)(T^<em>)(Y^</em>)). - Broad definition: the creation of a new set of characteristics ([C^<em>)(C^</em>)(T^*)) even though (Y^) remains unchanged, to some extent(^7).</td>
<td>- Increase in the weight (quality) of characteristics(^7).</td>
<td>- Addition (substitution or elimination) of characteristics(^1).</td>
<td>- Combining or splitting up groups of existing characteristics(^3).</td>
</tr>
<tr>
<td>Nature of action on the dominant design (or the technical characteristics (T))</td>
<td>- As shown above, it establishes a new dominant design or (T^*). That is new core components of knowledge are linked together in a new architecture(^7)(^11).</td>
<td>- As shown above, it has no impact on the dominant design. Though, it improves the core components of knowledge within the framework of a stable architecture(^7)(^9).</td>
<td>- As shown above, it refines, elaborates, and extends the dominant design previously established by adding new (or substituting or eliminating old) core components of knowledge(^7)(^9)(^11).</td>
<td>- As shown above, it reconfigures the existing design (architecture) without touching the core components of knowledge themselves(^9).</td>
</tr>
<tr>
<td>Nature of the action on established competences</td>
<td>- Competence destroying(^7)(^9)(^11). Innovation in the red zone destroys the competences of the various stages in the value chain. Other innovations may have different faces(^12).</td>
<td>- Competence enhancing(^7)(^9)(^11).</td>
<td>- Competence enhancing(^7)(^9)(^11).</td>
<td>- Competence enhancing and destroying (enhance the competences related to the component knowledge, and destroy the competence related to the architectural knowledge)(^7)(^9)(^11).</td>
</tr>
</tbody>
</table>


Source: Self.
Several notes need to be made regarding the previous table. First, each type of innovation requires different learning mode on the part of the innovating unit. Second, from the point view of the characteristics-based approach, radical and improvement innovations are extremes on a continuum, based on their impacts on the system of vectors. Third, a special emphasis is made regarding the impact of the innovation on the technical characteristics (T), also known as the dominant design, a well known concept within the innovation literature. From an evolutionary perspective of technical change, there are two ears of dynamic technical change: the “era of ferment”; and the “era of incremental change”. The former precedes the appearance of a dominant design (a stable set of new technical characteristics) and mainly characterized by exploration and experimentation, captured by the first mode of learning. The latter succeeds the appearance of the dominant design, and seeks to preserve this design by introducing incremental innovations to refine, elaborate, and extend the dominant design (Anderson and Tushman, 1990: 606). On the firm level, and during the era of incremental innovation, as the firm “evolves”, new optional service characteristics (or “modules”) are added to the basic service (Gallouj and Weinstein, 1997). This opens the possibility of introducing architectural innovation (Henderson and Clark, 1990). The previous table also shows that each mode of innovation has different impact on the established competences of the unit receiving the innovation. However, if one innovation is introduced through a network of providers, the innovation may have different “faces”, being radical for one node, incremental for another node, and architectural for a third node (Afuah and Bahram, 1995: 51). Having presented and discussed the two theoretical tools of the characteristics-based approach to innovation and technical change, I will not turn to justifying why the current research project adopts this approach.

3.2.4 The Advantages of the Characteristics-based Approach

Table 3.5 lists the major advantages of the characteristics-based approach to innovation and technical change.
Chapter 3 Innovation Approaches and Typologies

A powerful tool for detecting technical change. This approach has the ability to explicitly define the current state of technology, and is able to detect improvement or change (on the qualitative level) (Gallouj and Weinstein, 1997; Savioit and Metcalfe, 1984). This approach, thus has the ability to overcome the issue of ambiguity and the misclassification of the degree of innovativeness found in past conceptual and empirical research of innovation typologies.

A general (integrateive) approach to (industrial and service) innovation. This approach is sufficiently flexible to include both goods and services without sacrificing any of the specific aspects of innovation in services”. More specifically, it does not overlook the nontechnological aspects of service innovation, ‘or neglect the fuzzy' nature of service output. It also reveals several modes of innovations valid for both goods and services. Such a common conceptual framework is required for several reasons. First, the immaterial components of goods are becoming important as the manufacturing companies increasingly offer bundles of products and services, known as “servitization” or “services around the product”. Similarly, service firms are often interested in complementing their service offerings with products, known as “productization”. In other words, “many firms do not sell a good or a service but a system or a ‘package’ of closely linked goods and services”. Second, some firms working in “high-tech areas” and traditionally known as manufacturing companies are now in fact “genuine service companies”. The most frequently cited examples are “IBM and Benetton. At a more conceptual level, it can be said that many manufacturing companies no longer define themselves in the same way as companies producing goods but rather like companies creating solutions. . . . Thus a car manufacturer sees itself as a provider of services in kilometers”. Third, the industrialization of certain service activities (standardization, the introduction of technical systems, etc.) is becoming easier and cheaper. All in all, taking into consideration that the boundaries between manufacturing and service industries are tending to fade, it is strongly suggested that this approach need to be widely applied in future research, including “surveys” (de Vries, 2006; Djellal, et al., 2003: 426; Drejer, 2004: 553; Gallouj, 2002; Gallouj and Savona, 2009; Gallouj and Weinstein, 1997; Salunke, et al., 2011; Toivonen and Tuominen, 2009). Finally, a common conceptual framework of innovation would overcome the inconsistency observed in past research, and would improve generalizability across studies, and help in building a cumulative body of work dealing with the innovation phenomenon.

More consistent with the most recent thought of the marketing literature. It should be noted that such an integrateive thought is more consistent with the most recent perspective emerged in the marketing literature in which marketing has moved from “goods-centered dominant logic” to “service-centered dominant logic”. That is the integrateive approach and the service-dominant logic is consistent along two major themes: (1) the role of goods; and (2) the role of customers. Regarding the former, “consumers do not need goods. . . . They need services that satisfy their needs”. In other words, “goods are transmitters of operant resources (embedded knowledge); they are intermediate ‘products’ that are used by other operant resources (customers) as appliances in value-creation processes”. Regarding the latter, customer is no longer “the recipient of goods”. Rather, customer is “a co-producer of service” (Vargo and Lusch, 2004: 7).

Reconcile both the science push and demand pull. The description of the service in terms of characteristics clearly reconciles both: the technology/science-push denoted by the vectors “(T) and/or (C)” and the demand-pull denoted by the vector “(Y)”. While the former refers to pushing technological or scientific innovations to primary service providers or customers, the latter refers to clients asking for specific solutions or primary providers providing new services and demanding innovations from secondary providers. In so doing, “innovation may use one of these two points of entry, or both at the same time”. In this respect, the vectors (T) and (C) encompass not only technologies in the “narrow sense” of the term and competences relating to those technologies, but also the technologies specific to services (intangible techniques, like legal, financial, actuarial, commercial, etc.) and the competences corresponding to them. This has consequences for the definition of technological trajectories in services. A technological trajectory can be defined as “a path of gradual improvement in the vector (TY), including its tangible and intangible aspects. It is also possible to introduce to the “purest services” the concept of “cognitive [or competence] trajectories”. A cognitive trajectory can be defined as “the gradual improvement of competences (C) as a result of individual and collective learning processes, and the accumulation and exploitation of expertise” (de Vries, 2006; Gallouj and Weinstein, 1997: 554).

Source: Self.
3.3 Summary

I have sought to present and discuss two critical points related to: innovation views and approaches; and innovation types. In section one, I have sought to categorize several innovation views and approaches into three homogenous groups (economists, technologists, and sociologist). This categorization is mainly based on three dimensions: the stage of innovation; the level of analysis; and the types of innovation. This categorization has been supported by several innovation definitions. I have placed a special emphasis on two quite different views and approaches within sociology: variance sociologists; and process sociologists. I have placed the current research project within the stream of process research, and introduced a working definition that is believed to be sufficiently general to cover the wide scope of the current research inquiry (LI, LII, and LIII). I have also emphasized the critical role dynamic theories play in the current research project. In section two, I have started by discussing several issues of past conceptual and empirical research in innovation typologies and the degree of innovativeness. Three issues have been identified: ambiguity; misclassification of the degree of innovativeness; and inconsistency. I have suggested the characteristics-based approach due to its ability to overcome these issues. I have presented and discussed an updated version of this approach. Two theoretical parts have been presented and discussed: the characteristics-based representation of a product; and four innovation modes (radical innovation, improvement innovation, incremental innovation, and architectural innovation). I have also made an attempt to link this typology with other innovation typologies. I concluded this section by justifying why the current research project adopts this approach by listing its advantages.

In Chapter 4, I will critically review past conceptual and empirical research in the key drivers of radical innovation success/performance to be able to identify its contribution, and most importantly its (methodological, conceptual, and empirical) gaps and deficiencies that the current research project is going to fill in.
Chapter 4 Key Drivers of Radical Service Innovation Success

The aim of this chapter is to critically review the relevant literature on the key drivers of the success/performance of radical innovation in the service context. The chapter is organized in four main sections. In section one, I will review the internal and external drivers of service innovation. I will start by reviewing the organizational led innovation. Several theories of entrepreneurship and resource-based views of the firm will be briefly discussed. In the following, I will critically review past research to explore the knowledge gap in the organizational led innovation. Following this is a critical review of the market led innovation. In section two, several theories of sustainable competitive advantage, which the current research project is intended to adapt when measuring innovation success, will be briefly reviewed. In the following, I will critically review past research in the success/performance measurement of radical innovation to explore the knowledge gap. In section three, I will list the criticisms of the RBV of the firm, dominating the literature of entrepreneurship, strategic management, and innovation. In section four, I will present a summary of the chapter.

4.1 Drivers of Service Innovation

As a basis for presenting the internal and external drivers of radical service innovation performance, I will start by setting up these drivers in a scheme. These components can be broadly grouped into: organizational led innovation (internal drivers); and market led innovation (external drivers and factors leading to innovation). The market led innovation, on the other hand, will be grouped into: actors; and trajectories. Figure 4.1 depicts the components of service innovation drivers.
I will start this section by discussing the organizational led innovation. Although external factors (e.g., changes in markets, policies and regulations, and technologies) can trigger and stimulate innovation and some external actors may support, enhance, and even led the innovation, it is the capabilities and competences of the proactive entrepreneurial (enacting) organization that make it qualified to respond to such triggers and stimuli, exploit external opportunities, and even shape the environment (Daft and Weick, 1984; Davies and Brady, 2000; Mowery and Rosenberg, 1979; Penrose, 1959; Vega-Jurado et al., 2008).

4.1.1 Organizational Led Innovation

Organizational-led innovation (resource-based innovation, or organizational capabilities and competences for innovation) may be defined as the comprehensive set of capabilities and competences should be accumulated and developed by the entrepreneurial firm to successfully initiate, facilitate, support, and implement radical innovations (Barrett and Sexton, 2005; Leifer, et al., 2000; Leifer et al., 2001; Mowery and Rosenberg, 1979; O'Connor and DeMartino, 2006). Before critically reviewing the relevant literature, it is essential to briefly discuss several theories and concepts related to entrepreneurship and resource-based views of the firm.
4.1.1.1 Theories of Entrepreneurship and Resource-based Views

I will start this section by briefly discussing several views and concepts of entrepreneurship and entrepreneurial orientation. In the following, I will briefly discuss two counter resource-based views of the firm. Following this is a discussion of several resource-related concepts (e.g., resources, capabilities, competences, and dynamic capabilities). This section will be concluded by briefly discussing a dynamic theory of asset stock accumulation.

Entrepreneurship and Entrepreneurial Orientation (EO)

Abernathy and Utterback (1988) define entrepreneurship as the identification of an emerging need, or a new way to meet an existing need. Lumpkin and Dess (1996) define entrepreneurship as the process, practices, and decision-making activities that lead to a new-venture creation. Alavarez and Busenitz (2001) define entrepreneurship as the recognition and exploitation of opportunities that result in the creation of a firm that seeks to obtain entrepreneurial rents. Entrepreneurship has been studied at different sizes and types of organizations (small, medium, and large; proactive vs. acquisitive; incumbent vs. non-incumbent), and/or linked to different modes of innovation (radical vs. incremental).

For example, some scholars adopt the view that entrepreneurship is dominated by individual entrepreneurs (the entrepreneurial model of innovation or Schumpeter Mark I). In this pattern of entrepreneurship, individual entrepreneurs establish new small firms in an industry to introduce new products and/or processes, and thus disrupt the established practices of production and distribution, in a way that challenges established firms. Thus, individual entrepreneurs are seen as the major input for radical innovations. Others adopt the view that this phenomenon is dominated by corporations (the corporate model of innovation or Schumpeter Mark II). In this pattern of entrepreneurship, corporations devote more resources to innovation (e.g., financial resources, R&D laboratories, technical expertise), and thus can produce radical innovations. Thus, corporations are seen as the major input for radical innovation. While the previous reflects a view that a (small vs. large) entrepreneurial firm should be a first-mover (leader) through innovation, other scholars argue that this view is very restrictive as an entrepreneurial firm may show a proactiveness type of entrepreneurship in one situation, an acquisitive type in another situation, and an imitative type in a third situation.
Recognizing the divergent nature of entrepreneurship research, some scholars have sought to develop a more general theory of entrepreneurship, and entrepreneurial orientation (EO). Lumpkin and Dess (1996) and Lyon et al. (2000) are notable examples. Based on a review of several entrepreneurship theories and typologies, and also based on a review of empirical findings, they have sought to clarify the multidimensional nature of the firm (rather than the individual) pattern of EO, and to suggest alternative contingency models to frame research questions and further researchers' understanding of EO-performance relationships. In this respect, they argue that a firm that engages in an effective combination of five dimensions is conceived as entrepreneur. These five dimensions are: (1) autonomy; (2) innovativeness; (3) risk taking; (4) proactiveness; and (5) competitive aggressiveness. Autonomy refers to the independent action (taken free of stifling organizational constraints) of an individual or a team in bringing forth an idea or a vision and carrying it through to completion. Innovativeness refers to a tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes. Risk taking refers to the firm (the TMT rather than an individual) proclivity to engage in and commit resources to risky projects, with uncertain outcomes. Proactiveness (opportunistic) refers to taking initiative by anticipating, pursuing, and seizing new opportunities in order to shape the environment to one’s own advantage (that is to influence trends, and perhaps, even creates demand). Competitive aggressiveness refers to a firm’s propensity to directly and intensely challenge and outperform its rivals by adopting unconventional tactics and doing things differently (beating competitors to the punch).

Lumpkin and Dess (1996: 162) Lyon et al. (2000: 1078) argue that although all the five dimensions are central to understanding the entrepreneurial process, these dimensions may occur in different combinations, and an effective combination depends on the type of entrepreneurial opportunity a firm pursues. In other words, the relationship between EO and performance is context specific. They suggest that future research needs to: (1) examine specific situations individually; (2) employ fine-grained methodologies (e.g., intensive field research, and case studies) that allow opening the “black box” (examining
the processes through which entrepreneurial firm behaviour enhances a firm’s competitive position and performance) and identifying any intervening variables; and (3) incorporate a resource-based view of the firm (RBV) when developing their conceptual frameworks to be able to link the relevant entrepreneurial dimensions to other predictors (e.g., culture), explaining performance. They state that “the relationship of EO to other key predictor variables such as strategies and tactics, industry life cycle, and size are fertile areas for future research”.

In fact, many scholars in different research fields have made similar suggestions, particularly: (1) the need for undertaking longitudinal (process) research due to its ability to open the black box when investigating dynamic phenomenon (e.g., organizational change, innovation, entrepreneurship, and competition); and (2) the need for adopting a resource-based view of the firm when identifying the real sources of superior performance (Alvarez and Busenitz, 2001; Greene et al., 1999; e.g., Kraaijenbrink, et al., 2010; Lichtenstein and Brush, 2001; Priem and Butler, 2001a; Robson, 2011; Tsoukas and Chia, 2002; Van de Ven, 1986, 1992, 2007; Van de Ven and Huber, 1990; Van de Ven and Poole, 1990, 2005; Wiklund and Shepherd, 2003; Wolfe, 1994).

While Lumpkin and Dess (1996) suggest incorporating the RBV into the conceptualization of the entrepreneurial orientation (EO) construct, Alvarez and Busenitz (2001: 772) make an attempt to build general a theory of entrepreneurship by elaborating on the assumptions and theoretical framework of RBV. They conclude their theory by stating that “distinctions have been made between RBT (resource-based theory) and knowledge theories of the firm and dynamic capability theories, a characterization that RBT is Ricardian and not Schumpeterian. . . . However, we argue in this paper these distinctions are artificial, knowledge and dynamic capabilities are an extension of the boundaries of RBT”.

This chapter disagree with Alvarez and Busenitz (2001) in that the distinctions between the RBV and other resource-based views (specifically the competence-based view) are artificial. I will argue in the following section that the RBV and competence-based view (CBV) are counter schools of thought, and while the former is more relevant when investigating the acquisitive from of entrepreneurship, the latter is more relevant when addressing the proactive from of entrepreneurship. I will also argue that there is misinterpretation to: (1) the assumptions underlying both the RBV and CBV; and (2)
the theoretical contributions brought by notable scholars, like Schumpeter (1934, 1942), Penrose (1959), Dierickx and Cool (1989a), to the fields of strategic management, innovation and entrepreneurship.

**Counter Resource-based Views**

There is a problem that seems to be common in most areas of organizational research and strategic management research. It is to neglect the assumptions underlying the relevant literature. This, in many instances, has led to misinterpreting the contributions originally delivered by seminal works, e.g., the work of “Cohen and Levinthal (1990)” in absorptive capacity (Lane et al., 2006: 838), and the work of “Penrose (1959)” in entrepreneurship, knowledge creation, and organic growth (Rugman and Verbeke, 2002: 771-772). Thus, the first essential theoretical task is to clarify the assumptions of the literature.

Generally speaking, there are two counter resource-based views of the firm (two views of resource-based competition, or two views of internal antecedent-based superior performance) that have been identified in the strategic management literature. The first is the capability-building mechanism which adopts Schumpeter and Penrose economics (Schumpeter (1942) and Penrose (1959)), and has been codified into the competence-based view (CBV) of the firm, also known as the social constructionist school, the strategic selection view of competitive advantage, and the proactive type of entrepreneurship. The second is the resource-picking mechanism which adopts the Ricardian perspective and follows other disciplines as neoclassical economics and industrial organization economics (environmental determinism), and has been codified into the resource-based view (RBV) of the firm, also known as the rational-equilibrium school, the environmental determinism view of competitive advantage, and the acquisitive type of entrepreneurship (Lado, et al., 1992; Makadok, 2001; Seoudi, 2009).

Both schools have counter assumptions regarding the nature of strategic resources (the antecedents or determinants of superior performance), and the role of strategic managers (entrepreneurial executives). Four main features characterize the CBV. **First**, strategic managers are entrepreneurs and resource builders. **Second**, strategic resources are asset stocks that are proactively accumulated internally. **Third**, strategic resources are embedded (higher-order or theoretical concepts). **Fourth**, strategic resources may be
complementary, interconnected and mutually reinforce each other. Contrary to the former school, the RBV is characterized by the following. First, managers are conceived as rational, optimizers, and stock-pickers. Second, strategic resources can be proactively acquired from the strategic factor market. Third, strategic resources are conceived as elementary resources rather than higher-order theoretical concepts. Fourth, strategic resources are treated as singular distinct items rather than a bundle of resources that gives a synergistic result (Black and Boal, 1994; Dierickx and Cool, 1989a, 1989b; Lado, et al., 1992; Madhavaram and Hunt, 2008; Makadok, 2001; Penrose, 1959; Seoudi, 2009).

Thus, each school of thought directs a scholar attention toward counter issues (Lado, et al., 1992), such as building asset stocks vs. picking and deploying resources; higher-order resources vs. elementary resources; interconnected, complementary resources vs. singular distinct items; and managers as entrepreneurs and resource builders vs. managers as optimizers and stock-pickers. This has had critical implications for how resources, capabilities and competences have been defined and conceptualized in strategic management research to the extent that, as argued by several scholars (e.g., Bogner et al., 1999: 276; Day, 1994; Hamel, 1994), these concepts have become “quite muddled” in a way that caused confusion to academics and practitioners and impeded the development of common language and shared understanding. As stated by Rugman and Verbeke (2002: 770), “even the exact definitions of key concepts, such as resources, competences, core competences, capabilities, and dynamic capabilities, have not been agreed upon or remain ambiguous and controversial”. The innovation literature is not an exception. For example, Danneels (2002: 1102) state that this plethora of terms and the associated terminological confusion plagues the innovation research, and the literature “has apparently not arrived at consensus regarding the meaning of these terms”. But, as I have just shown, this confusion may be due to the fact that capabilities and competence have been discussed and examined by scholars, adopting counter assumptions. The previous discussion shows that it is essential to clarify the resource-related concepts: generic resources, capabilities, competences, core competences, and dynamic capabilities. It is also critical to discuss the meaning of asset stocks and the process by which entrepreneurial resource builders accumulate these asset stocks.
Resource, Capability, (Core) Competence, and Dynamic Capability

A generic resource could be acquired from the strategic factor market. It represents the building block of high-order, operant resources, and can be either tangible (e.g., physical resources) or intangible (e.g., the skills and knowledge of employees). These generic resources cannot be considered as a source of sustainable competitive advantage (SCA) if they are freely tradeable. A capability is a combination of two or more distinct, basic resources that collectively enable the firm to perform a task, a process, or a function more effectively and efficiently. A capability is a knowledge-based resource, and thus is conceived as an asset stock (discussed later). Although capabilities are essential entities in the value creation, not all capabilities are considered as sources of competitive advantage. A lower-order capability (e.g., task-capability) represents a configuration of a simple network of resource factors, and thus could be readily and easily identified by competitors. A higher-order capability (e.g., functional-capability), on the other hand, might be eligible to generate competitive advantage due to the complexity of the structural network of this broad resource. A competence is “an interconnected set of knowledge collections—a tightly coupled system”. It is a combination of specific set of capabilities (and their constituent factors), which are interconnected and mutually reinforce each other (discussed below). It enables the firm to perform very broad process (e.g., cross-functional processes, or cross-unit processes) more effectively and efficiently. It is also knowledge-based resource, and thus is conceived as an asset stock. When a competence becomes crucial to the firm’s mission, it is executed consistently well (and thus institutionalized), and it enables an organization to outperform others in the industry, it becomes a core competence. A core competence is considered as sources of competitive advantage as it represents a configuration of a very complex network of lower-order capabilities, and thus could not be either readily or easily identified by competitors (Black and Boal, 1994; Brush et al., 2001; Day, 1994; Dierickx and Cool, 1989a; Greene, et al., 1999; Javidan, 1998; Leonard-Barton, 1992: 122; Madhavaram and Hunt, 2008; Prahalad and Hamel, 1990).

While an operational core competence is considered as the real source of SCA, it might not serve well future opportunities, especially in rapidly changing environments. Thus, an operational core competence might be core rigidity (organizational inertia), if the firm is not able to rejuvenate its existing operational core competence. Hence, it is important to consider what is called dynamic capability, which reflects the firm’s
ability to design and implement new value-creating strategies. (Please note that, in the strategic management literature, *strategy* may be defined as *the identification of objectives, and the accumulation of the desired stocks of strategic resources and capabilities that enable the accomplishment of these objectives* (Dierickx and Cool, 1989a; Sanchez, 2008).) In other words, dynamic capability reflects the ability to *reconfigure* the current resource base by accumulating and bundling new valuable resources required to implementing these new strategies and releasing existing resources that do not fit the new strategies. *One cornerstone of dynamic capability is innovation.* While, the existing (operational) capabilities and competences might be considered as *zero*-level resources, capabilities and competences required to producing incremental innovations might be called *first*-order dynamic capability, and capabilities and competences required to producing radical innovations might be called a *higher-order change capability* (Davies and Brady, 2000; Eisenhardt and Martin, 2000; Ellonen, *et al.*, 2009; Leonard-Barton, 1992; Salunke, *et al.*, 2011; Teece *et al.*, 1997; Winter, 2003). Having presented several concepts central to the CBV, I will now discuss the theory of asset stock accumulation.

**The Theory of the Asset Stock Accumulation**

Several scholars (e.g., Davies and Brady, 2000; Hamel and Prahalad, 1989; Lado, *et al.*, 1992; Maidique, 1980; Makadok, 2001; Penrose, 1959) have contributed to the CBV of the firm. They adopt the corporate model of entrepreneurship when arguing that corporate executives and strategic managers are the builders of strategic resources. They argue that a team of entrepreneurial executives are responsible for constructing new valuable resources and bundling them with the previously acquired or inherited resources to develop the firm’s special productive opportunity (organizational capabilities) that enables it to expand and compete on innovation. However, none of the previous scholars have developed a conceptual framework featuring the attributers characterizing the process by which these strategic resources are built. In this respect, Dierickx and Cool (1989a) contribute to the strategic management literature by introducing the most fully articulated model of intangible asset accumulation. It is critical to discuss this model as the current research project is mainly interested in intangible asset stocks (capabilities and competences). Dierickx and Cool (1989a) first distinguish between what they call asset *stocks* and asset *flows* as shown below.
Chapter 4 Key Drivers of Radical Service Innovation Success

The fundamental distinction between stocks [e.g., “R&D capability”, “reputation for quality”, “firm-specific human capital”, “dealer loyalty”] and flows may be illustrated by the ‘bathtub’ metaphor: at any moment in time, the stock of water is indicated by the level of water in the tub; it is the cumulative result of flows of water into the tub (through the tap) and out of it (through a leak). In the example of R&D [capability], the amount of water in the tub represents the stock of know-how at a particular moment in time, whereas current R&D spending is represented by the water flowing in through the tap; the fact that know-how depreciates over time is represented by the flow of water leaking through the hole in the tub. A crucial point illustrated by the bathtub metaphor is that while flows can be adjusted instantaneously, stocks cannot. It takes a consistent pattern of resource flows to accumulate a desired change in strategic asset stocks. It follows that a key dimension of strategy formulation may be identified as the task of making appropriate choices about strategic expenditures (advertising spending, R&D outlays, etc.) with a view to accumulating required resources and skills (brand loyalty, technological expertise, etc.). In other words, appropriate time paths of relevant flow variables must be chosen to build required asset stocks. (Dierickx and Cool, 1989a: 1506-1507)

Dierickx and Cool (1989a), then, examine the process by which asset stocks are accumulated, and identify five attributes, characterizing the accumulation process. Of particular importance are: time compression diseconomies; asset mass efficiencies; and interconnectedness of asset stocks. These three attributes are briefly discussed below as they have critical implications for the conceptualization of the Core Radical Innovation Competence (Core RIC).

Time Compression Diseconomies

Time compression diseconomies represent a fundamental attribute of the process by which specific strategic asset stock is accumulated. In the example of R&D capability, maintaining a given rate of R&D spending over a particular time interval produces a larger increment to the stock of R&D know-how than maintaining twice this rate of R&D spending over half the time interval. Thus, crash R&D programs are less effective than programs where annual R&D outlays are lower but spread out over proportionally longer period of time. In other words, the process of asset stock accumulation cannot be rushed as it is less effective and more inefficient (incur disproportionate cost) to rapidly accumulate this stock by simply throwing money at the accumulation process (Dierickx and Cool, 1989a; Garud and Nayyar, 1994). Accumulating a stock requires considerable time because this stock is built through learning and experience (Bharadwaj, 2000; Day, 1994; Kogut and Zander, 1992; Powell and Dent-Micallef, 1997; Ritter and Gemünden, 2004). The work of Knott, et al. (2003) provides empirical support for this attribute.
**Chapter 4 Key Drivers of Radical Service Innovation Success**

**Asset Mass Efficiencies**

This attribute implies that the initial level of an asset stock significantly influences the pace of its further accumulation. For example, a firm that already has a high level of R&D know-how is often in a better position to make further breakthroughs and add to its existing stock of knowledge than a firm that has low initial level of knowledge. In this respect, building asset stocks starting from low initial levels may be difficult (Bharadwaj, *et al.*, 1993; Dierickx and Cool, 1989a; Grant, 1991). Knott, *et al.* (2003: 193) define this attribute as the “economies of scale in the production of intangible asset stock from existing asset stock, such that the productivity of investments in the current period increases with larger asset stocks”.

**Interconnectedness of Asset Stocks (Complementarity)**

This attribute indicates that the pace of an asset stock's accumulation may be influenced by the level of other asset stocks. In other words, accumulating increments in an existing asset stock (e.g., R&D know-how) may not depend only on the level of that stock (as discussed in the asset mass efficiencies), but also on the level of another asset stock which is its complement. This implies that a lack of complementary resources can often impede a firm from accumulating a desired asset stock needed to successfully implement a value-creating strategy (Dierickx and Cool, 1989a). Amit and Schoemaker (1993: 39) call this attribute as “economies of scope in asset accumulation”, which mean that the value of one strategic asset will be maximized with the value of its complement due to the existence of bilateral dependence. The work of Leonard-Barton (1992), Pennings and Harianto (1992), Powell and Dent-Micalef (1997), Thomke and Kuemmerle (2002), Cassiman and Veugelers (2006), and Menor and Roth (2007, 2008) provide empirical support in that a set of (innovation) related resources are complementary and mutually support each other. Scholars and methodologists (e.g., Law and Wong, 1999; Law *et al.*, 1998; Madhavaram and Hunt, 2008; Miles and Huberman, 1994) assert that when several variables and constructs (capabilities and competences) are complementary, they need to be conceptualized as lower-order dimensions underlying one *superordinate theoretical (multidimensional) construct*. In other words, complementary capabilities should be conceptualized as latent multidimensional construct (factor view) rather than aggregate multidimensional construct (composite view).
4.1.1.2 Summary and Conclusion

I have discussed several theories and concepts of entrepreneurship and resources-based views of the firm. I have shown that RI is considered as a higher-order change dynamic competence required to overcome the core operational rigidities, and create the competitive advantage of the future. I have shown that entrepreneurship research strongly recommends incorporating the RBV of the firm. I have overviewed two counter resource-based views of the firm (the CBV vs. the RBV). I have found that the CBV, which is grounded in Schumpeter and Penrose evolutionary economics, is the most relevant when approaching the proactive type of entrepreneurship, while the RBV, which is grounded in Ricardian perspective and follows other disciplines as neoclassical economics, is the most relevant when approaching the acquisitive type of entrepreneurship. As the current research is primarily concerned with the proactive type of entrepreneurship, the CBV is identified to be the relevant body of research to adopt. Thus, the claim that the RBV is relevant for all types of entrepreneurship is not valid.

Taking into consideration that the RBV is only a view of value appropriation and the CBV is a view of both value creation and appropriation (Rugman and Verbeke, 2002), it is the latter than the former that represents a promising view to be incorporated into entrepreneurship research, seeking to investigate the proactive type of entrepreneurship. Within the adopted view, several assumptions are discussed: (1) entrepreneurial executives are capability and competence builders; (2) a capability and competence are knowledge-based, requiring longer term approach to be accumulated and adjusted; (3) a capability is a theoretical (embedded, higher-order, or multidimensional) construct; and (4) if several capabilities are interconnected (complementary), they need to be conceptualized as dimensions underlying one superordinate theoretical construct.

Having discussed several theories and situated the current research project within the relevant body of research, I will critically review past (empirical and conceptual) research. However, as mentioned above, I need to be explicit about the size of the entrepreneurial firm, and the type of opportunity pursued. As mentioned in the Introductory Chapter, the current research project is mainly interested in examining the capabilities and competences that make large financial services institutions qualified for successfully introducing radical innovations. In other words, the large size refers to the corporate model of entrepreneurship or Schumpeter Mark II (rather than
Schumpeter Mark I), and the radical innovation refers to the *proactiveness* type of entrepreneurship (rather than the acquisitive or imitative types).

### 4.1.1.3 Knowledge Gaps in Organizational Led Innovation

I will critically review relevant past research in the key capabilities, competences, and determinants of (radical) innovation success. The key characteristics of each study (e.g., the research aim, the methodological approach employed, and the relevant key findings) will be outlined. This section will be concluded by identifying the contribution of past research, in addition to the gaps and deficiencies that the current research project is intended to fill in.
Chapter 4 Key Drivers of Radical Service Innovation Success

Table 4.1: A Review of Relevant Past Research on Key Innovation Drivers

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal/The purpose of the study</th>
<th>Approach/Unit of analysis/Sample</th>
<th>Relevant Variables/Findings</th>
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<tbody>
<tr>
<td></td>
<td>To empirically examine the correlates of the adoption of both radical and incremental technical process innovations.</td>
<td>-The innovation.</td>
<td>-The depth of knowledge resources (the presence of technical specialists) is an important predictor for the adoption of both radical and incremental innovations. Though, it has a stronger effect on radical than on incremental adoption.</td>
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<td>-6 innovations (3 radical and 3 incremental), adopted by 40 footwear manufacturers.</td>
<td>-Large firms (size) are an important predictor only for radical innovation adoption.</td>
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<td>-Decentralized structure and decision making, managerial attitudes favoring change, and exposure to external information are not significant predictors of adoption of either innovation type.</td>
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<td>Leonard and Maidique (1990)</td>
<td>Management Science</td>
<td>-Triangulation, but mainly variance (cross-sectional) research.</td>
<td>-Key factors positively related to new product outcome are:</td>
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<td>To examine the factors, differentiating the successful from unsuccessful development process concerning incremental technological innovation in the industrial context; and</td>
<td>-Product pair (one success and one failure).</td>
<td>-1) R&amp;D (excellence) competence; (2) a technically superior product performance; (3) providing significant value (benefit to cost) to the customer (not to be me-too product); (4) synergy with existing competences, the new product built upon the existing competences or strengths (e.g., marketing, manufacturing, organizational); and (5) top management support during the whole NPD process.</td>
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<td>-To develop a model for new product outcome.</td>
<td>-Four year study, involving three phases (undertaken in the USA): exploratory survey (158 new electronics products); a case study validation (21 cases); and large scale survey for hypotheses testing (172 new electronics products).</td>
<td>-Also important but less significant are: (6) the marketing and manufacturing competence; and market factors such as (7) a weak form of market competition; and (8) entering large and growing market.</td>
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<td>Leonard-Barton (1992)</td>
<td>Strategic Management Journal</td>
<td>-Qualitative (case study) research.</td>
<td>-The core NPD capability is a higher-order concept manifested by four interrelated, interdependent dimensions:</td>
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<td>-To adopt a knowledge-based view; and</td>
<td>-The development project.</td>
<td>-The skills and knowledge embodied in people;</td>
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<td></td>
<td>-To propose a new view of core NPD capability as antecedent for technological innovation in the industrial context.</td>
<td>-20 case studies of new product and process development projects in five USA industrial firms.</td>
<td>-Knowledge embedded in technical systems;</td>
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<td></td>
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<td>-Managerial systems; and</td>
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<td></td>
<td>-Corporate culture (the often overlooked dimension).</td>
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<td>Cooper, et al. (1994)</td>
<td>Journal of Product Innovation Management</td>
<td>-Variance (cross-sectional) research.</td>
<td>-Nine factors have been found to differentiate the top third of performers from the bottom third on three performance dimensions (financial performance; relationship enhancement; market development).</td>
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<td>-To investigate the factors that separate very successful new service products (major successes) from the ordinary (modest successes) in the financial service sector (e.g., banks, insurance firms, trust companies).</td>
<td>-The new service product project.</td>
<td>-Six factors are found to be key determinants for financial performance. These are: (1) marketing synergy; (2) a market-driven new product process; (3) effective marketing communication; (4) better customer services; (5) managerial and financial synergy; and (6) launch preparation.</td>
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<td>-173 new financial (retail and business) services.</td>
<td>-Four factors are found to be key determinants for relationship enhancement. In addition to factors 2 and 6 mentioned above, two new factors are identified. These are: (7) product responsiveness; and (8) product advantage.</td>
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<td>-Three factors are found to be key determinants for market development. In addition to factors 2 and 3 mentioned above, one new factor is identified.</td>
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Chapter 4 Key Drivers of Radical Service Innovation Success

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<tr>
<th>Author(s)</th>
<th>Journal/Media</th>
<th>Description</th>
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<td></td>
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<td>-Triangulation, but mainly variance (cross-sectional) research.</td>
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<td>-Development project practice.</td>
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<td>-Interviews with 10 executives and senior managers of new product development teams, followed by a survey of 44 executives and senior managers in 44 financial firms (banking, insurance, trust, securities, etc.).</td>
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<td>-Faster NPD is needed to: satisfy the changing customer needs and increase customer loyalty; respond to competitive pressures; heighten firm reputation and image.</td>
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<td>-Enablers are: (1) outsourcing of systems development and service delivery; (2) cross-functional teamwork; (3) considerable use of new technologies, e-mail, groupware; (4) organizational climate, above average commitment to innovation; (5) development of strategic plans for innovation; (6) linking rewards pay to innovation; (7) separate unit department for R&amp;D/innovation; (8) setting targets/goals for revenues from new products; (9) market orientation, using employee and customer suggestions; (10) a proactive innovation strategy; and (11) hiring new skills.</td>
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<td>-Qualitative (case study) research.</td>
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<td>-Development projects introduced both B-to-B and B-to-C services.</td>
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<td>-9 Swedish service firms working in different industries (e.g., financial, transport, telecommunications, and cleaning).</td>
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<td>-The innovation of new services is an extremely complex process when it comes to planning and control. Stages in the development process overlap and cannot be clearly identified. Four <em>overlapping</em> stages are identified: (1) the idea phase; (2) the project formation phase; (3) the design phase; and (4) the implementation phase.</td>
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<td>-They conclude that the development process cannot be formally planned as creativity and innovation cannot rely only on planning and control, and there must be some elements of improvisation, anarchy, and internal competition in the development of new services.</td>
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<td>Morris and Westbrook</td>
<td><em>British Journal of Management</em></td>
<td>-To explore the role of CEO (and top managers) in initiating and leading technical change, and</td>
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<td>-To explore the impact of the bank’s competitive situation and industry’s norms in framing managers’ assumptions about timing, scope, and objectives of change.</td>
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<td>-Qualitative (case study) research.</td>
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<td>-A successful technical change program.</td>
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<td>-A UK bank.</td>
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<td></td>
<td>-The critical success factors for rapid implementation program of a complex technical innovation or IT change that was not imitated by competitors are:</td>
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<td>-Top management commitment to measure and monitor progress.</td>
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<td>-Project management: setting very clear goals for the project (technological innovation adoption); (2) unambiguous operational parameters by which success is measured (volume, cost, and quality); (3) pilot operations in which experiments with hardware and software and with allocation of task were conducted; (4) problems experienced and their solution should be documented and fed into central model for application in subsequent phases; and (4) teams should assess risk, making contingencies, and assessing suppliers.</td>
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<td>-Past experience of centralization.</td>
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<td>-Human resource management.</td>
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<td>-Internal marketing, selling the innovation and explaining the rationale for</td>
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<tr>
<td>-To examine the effect of firm size (structural variable) and the willingness to cannibalize (attitudinal variable) on the organization’s propensity for radical product innovations.</td>
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<tr>
<td>-Variance (cross-sectional) research.</td>
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<tr>
<td>-The strategic business unit (SBU).</td>
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<tr>
<td>-194 SBUs working in three highly competitive and turbulent high tech industries (computer hardware, photonics, and telecommunication).</td>
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<td>-Firm size has no significant effect on radical product innovation.</td>
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<tr>
<td>-The willingness to cannibalize existing assets and routines is a key predictor of an organization’s propensity for radical product innovations.</td>
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<tr>
<td>-The willingness to cannibalize is explained by four organizational factors. These are: (1) the level of specialized investment in the current technology (negative effect); (2) the presence of active internal (autonomy and competition) market (positive effect); (3) strong product champion roles (positive effect); and (4) focus on future markets (positive effect).</td>
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<tr>
<td>-The effects of specialized investments and internal markets on radical product innovation are mediated fully by willingness to cannibalize, while the effects of product champion influence and future market focus on radical product innovation are mediated partially by willingness to cannibalize.</td>
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<thead>
<tr>
<th>Kusunoki et al. (1998)</th>
<th>Organization Science</th>
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<tbody>
<tr>
<td>-To propose different types of organizational capabilities and different types of new product performance;</td>
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<tr>
<td>-To explore the effects of these organizational capabilities on the different types of product performance; and</td>
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<tr>
<td>-To identify the core capability, holding a crucial relationship with performance.</td>
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<td>-Variance (cross-sectional) research.</td>
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<td>-New product.</td>
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<td>-1226 Japanese manufacturing firms.</td>
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<tr>
<td>-Three innovation-related capabilities are conceptualized as reflective second-order constructs manifested by a set of lower-order dimensions as follows:</td>
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<tr>
<td>-Local (firm-specific) capabilities, which is derived from the knowledge base, and manifested by technological accumulation and database;</td>
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<td>-Architectural capabilities, which is derived from the knowledge frame, and manifested by self-sufficiency, heavy-weight project manager, and task specialization; and</td>
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<tr>
<td>-Process capabilities, which are derived from the knowledge dynamics, and manifested by communication, leader's involvement, and shared experience.</td>
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<tr>
<td>-The empirical analysis demonstrates differential effects of the three types of organizational capabilities on different types of product performance.</td>
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<tr>
<td>-The results show that process capabilities are the most important antecedent for product performance, and as such described as core capability.</td>
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<tr>
<td>-To assess the impact of market knowledge competence and R&amp;D strength on new product advantage.</td>
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<tr>
<td>-Variance (cross-sectional) research.</td>
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<tr>
<td>-The market knowledge competence is assessed at the level of a NPD Program, while the new product outcome is assessed at the product level.</td>
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<td>-1047 US (different size) software companies.</td>
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<td>-The market knowledge competence is conceptualized as the processes (series of activities) that generate and integrate market knowledge. Three processes of market knowledge competence are identified: (1) customer knowledge process; (2) the marketing-R&amp;D interface; and (3) competitor knowledge process.</td>
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<tr>
<td>-The results show that the R&amp;D strength and the three components of the market knowledge competence have a significant impact on new product advantage. The ordered relative importance is: (1) marketing-R&amp;D interface; (2) R&amp;D strength; (3) customer knowledge process; and (4) competitor knowledge process.</td>
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<tr>
<td>-Qualitative longitudinal (case study) research.</td>
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<td>-A descriptive model, which includes 7 phases:</td>
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<td>-Conversion (direction) phase: the convergence of various technologies</td>
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</table>
Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
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<tr>
<th>To explore the key factors that affect the discontinuous NPD process, as well as the methods used for assessing the radical new products; and</th>
<th>-The project level. -8 radical industrial innovation projects.</th>
<th>-To develop a descriptive model of the radical product development process.</th>
<th>toward an application; -Formulation phase: formulating the technology into a product application. -Preliminary design phase; -Evaluation preparation phase (formal review); -Formative prototype phase: the development of exploratory prototype; -Testing and design modification phases; and -Prototype and commercialization phases.</th>
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<tr>
<td>-Academy of Management Review</td>
<td>-To update the extant NPD and NSD literature by extending the RBV and capability perspective to the innovation strategy.</td>
<td>Conceptual article.</td>
<td>-An agent-resource model is developed to get more understanding of NPD and NSD. Agents are multiple actors involved in the innovation activity, including team members, project leaders, senior managers, and suppliers. -It is suggested that agents are not only responsible for building the innovation related capabilities, but also their roles have an impact on innovation performance. -The innovation related capabilities are also suggested to have an impact on the innovation performance. In this respect, four groups of capabilities are suggested as antecedents for the new product/service performance. These are: -Technological capabilities (e.g., R&amp;D, manufacturing, and design); -External integrative capabilities (e.g., absorptive structures or networks of collaborations, and culture and values for external absorption); -Internal integrative capabilities (e.g., supportive managerial systems, and culture and values for internal integration); and -Marketing capabilities (e.g., marketing research tools, and strategic marketing management).</td>
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<tr>
<td>-Journal of Product Innovation Management</td>
<td>-To examine the influence of innovativeness on the factors that impact success and failure in the development of new business-to-business services.</td>
<td>-Variance (cross-sectional) research. -New service development project. -276 innovation projects (150 projects were successes and 126 projects were failed), undertaken by 115 Canadian firms.</td>
<td>-The findings show that there are two types of critical success factors: global success factors; and specific success factors. -The global success factors includes: -Ensuring an excellent client/need fit; -Involving expert front line personnel in creating the new service, and in helping customers appreciate its distinctiveness and benefits; and -Implementing a formal and planned launch program for the new service offering. -Factors specific to new-to-the-world services are: -Corporate culture, encouraging entrepreneurship and creativity; -Active involvement of senior managers in the role of visionary and mentor for new service development; -Good market potential; and -Marketing tactics that offset the intangibility of “really new” service concepts. -Installing a formal ‘‘stage-gate’’ new service development system, including: -Establishing clear objectives. -Involving customer in the design process (e.g. concept development and testing).</td>
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</table>
# Chapter 4 Key Drivers of Radical Service Innovation Success

- Carefully mapping or blueprinting alternative processes.
- Market testing.
- Planning and tracing the launch.
- The first three steps are found to be non-significant for RI success.

<table>
<thead>
<tr>
<th>Source</th>
<th>Journal/Book</th>
<th>Methodology</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Danneels (2002)</td>
<td>Strategic Management Journal</td>
<td>Qualitative (case study) research</td>
<td>First-order competences are found to be key competences in the development process. These are: Technological competence (e.g., manufacturing knowhow and engineering knowhow); and Customer competence (e.g., knowledge of customer needs and processes, and distribution and sales access to customers).</td>
</tr>
<tr>
<td>O'Connor et al. (2002)</td>
<td>Research-Technology Management</td>
<td>Longitudinal (case study) research</td>
<td>Radical innovation does not completely mature before transitioning it to the operating unit. There will be residual technical, market, and organizational uncertainties. As such, the development team of the receiving unit would not be able to employ tried and true project techniques such as the well-recognized Stage-Gate system. A transition tool, the Transition Readiness Assessment Form (TRAF), is developed and validated to help the transition team systematically consider the remaining work.</td>
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<tr>
<td>Souitaris (2002)</td>
<td>R&amp;D Management</td>
<td>Variance (cross-sectional) research</td>
<td>17 competences were initially proposed. The (objective) statistical findings show that 14 competences have a positive and statistically significant (though moderate) correlation with innovation indicator(s). The most important competences are: The highly educated staff (high proportion of university graduate); The high proportion of staff with managerial responsibilities; The high proportion of staff with experience in other companies; The intense R&amp;D; The marketing activities; and The extensive incentives to the employees to contribute towards new ideas.</td>
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<tr>
<td>Journal of Business Research (2004)</td>
<td>To develop and test a model that examines the impact of technologically-oriented strategy on innovation performance within the context of a network economy.</td>
<td>-Variance (cross-sectional) research. -New product. -308 German industrial companies.</td>
<td>-A technologically-oriented strategy (first-order construct) is essential to build (has a positive impact on) two competences: -Technological competence (a reflective second-order construct manifested by: technological collaboration reasons, and technological expertise); and -Network competence (a reflective second-order construct manifested by: network management task execution, and network management qualifications). -A comparison between the objective and perceptual results has shown that managers are aware of the important firm-specific competences leading to technological innovation.</td>
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<td>European Journal of Innovation Management (2006)</td>
<td>To develop an approach explaining the ability of a company to generate radical product innovations through the willingness to cannibalize.</td>
<td>-Variance (cross-sectional) research. -SBU. -87 SBU of 53 companies working in six industries (software, hardware, telecommunications, biotechnology, microelectronics and image processing) located in three countries (Germane, UK, and France).</td>
<td>-A comparison between the objective and perceptual results has shown that managers are aware of the important firm-specific competences leading to technological innovation. -Willingness to cannibalize a firms’ own investments strongly explains the ability to innovate radically. The study identifies 7 explanatory variables for radical innovations (the first three variables have stronger impact): -Emphasis on new customer (an emphasis on current customers reflects defensive marketing, leading to the production of incremental innovation); -R&amp;D management effectiveness (power promotor and technical promotor. The stronger the position of the promotor pair is in the organization, the more managers will tend to cannibalize); -Life-long learning that promote the willingness to abandon knowledge, experience, and actual investments in favor of a new technology. -Form cluster of suppliers (being a node within a very closely-knit community of suppliers); -Pay attention to non-specific invesment; -Organize core competencies to focus on the market; and -Create a market-focused organizations.</td>
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<tr>
<td>Journal of Product Innovation Management (2006)</td>
<td>To explore the capabilities of RI project management in established firm, seeking organic growth and renewal though these RIs.</td>
<td>-Qualitative longitudinal (multiple-case study) research. -The project level. -12 radical industrial innovation projects.</td>
<td>-A comparison between the objective and perceptual results has shown that managers are aware of the important firm-specific competences leading to technological innovation. -Firms must build and excel capabilities in three distinct sets of activities to have a fully developed (mature or sustainable) RI management competence. These are: -Discovery (exploratory) capability; -Incubation (experimentation and learning) capability; and -Acceleration (exploitation and transition) capability.</td>
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<tr>
<td>Information Systems Research (2006)</td>
<td>To examine how NPD work units leverage IT functionalities to perform IT-related activities, leading to a</td>
<td>-Variance (cross-sectional) research. -NPD work unit. -180 NPD Managers.</td>
<td>-The model is comprehensive, and includes several constructs. Of particulars importance are the following three competence constructs, which are conceptualized as formative second-order constructs. -IT leveraging competence in NPD, which is defined as the ability to</td>
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## Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Cooper and Kleinschmidt (2007)</th>
<th>Research Technology Management</th>
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<tr>
<td>-To explore the factors that drive new product performance at the business unit level.</td>
<td>-Variance (cross-sectional) research.</td>
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<tr>
<td>-161 industrial business units working in Germany, Denmark, US, and Canada.</td>
<td>-The study uncovered nine factors that distinguished the better performing businesses.</td>
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<tr>
<td>-A high quality formal new product process (six ingredients); -A defined new product strategy for the business unit; -Adequate resources—people and money—for new products (with adequate R&amp;D funding); and -R&amp;D spending for new product development (as a percentage of sales).</td>
<td>-The top four factors are:</td>
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<tr>
<td>-High-quality new product project teams; -Senior management committed to, and involved in, new products; -An innovative climate and culture; -The use of cross-functional project teams; and -Senior management accountability for new product results.</td>
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competitive advantage in NPD within turbulent environments.

effectively use IT functionalities, and aggregates three first-order dimensions: effective use of project and resource management systems; effective use of knowledge management systems; and effective use of cooperative work systems.

-NPD dynamic capability (re-configurability), which is defined as the ability to reconfigure functional competences to address turbulent environments, and aggregates four first-order dimensions: market orientation; absorptive capacity; coordination capability; and collective mind.

-NPD functional competence, which is defined as the ability to effectively execute operational NPD processes, and aggregates three first-order dimensions: NPD customer competence; NPD technical competence; and NPD managerial competence.

-The findings show that the IT leveraging competence in NPD indirectly influences competitive advantages in NPD, an impact that is fully mediated by NPD dynamic capability and NPD functional competence (IT leveraging competences explains NPD dynamic capability, which explains NPD functional competence, which explains competitive advantage in NPD).

-Moreover, environmental turbulence reinforces the positive impact of IT leveraging competence on NPD dynamic capability, and NPD dynamic capability on NPD functional competence, while it attenuates the impact of NPD functional competence on competitive advantage in NPD.
### Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Journal</th>
<th>Research Design</th>
<th>Sample</th>
<th>Key Findings</th>
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</table>
| Salomo et al. (2007) | *Journal of Product Innovation Management* | Variance research, The project level. 132 NPD projects. | - Five predictors are suggested to explain success. These are:  
  - Pre-decision business planning;  
  - Post-decision business planning, which involves two variables: project planning; and risk planning; and  
  - Process management, which includes two variables: high process formality, the presence of formal, highly structured process with milestone plans (Stage-Gates processes); and goal stability.  
- They find that: (1) the proficiency of pre-decision business planning has a positive impact on both proficiency of project planning and risk planning activities; (2) the proficiency of project planning and risk planning activities improve NPD performance indirectly through facilitating better process management (the proficiency of process management mediates the relationship, and there is no direct relationship between project planning and success due to the uncertainties; (3) high level of technical and market uncertainties moderate the process formality-success relationship (thus, process formality is not significant in case of radical innovation); and (4) goal stability enhances the performance of both incremental and radical innovation. |
| Dibrell et al. (2008) | *Journal of Small Business Management* | Variance (cross-sectional) research, The firm level. 397 US SMEs. | - Product and process innovations exhibits strong linkages with IT.  
- IT mediates the innovation to firm performance direct relationship.  
- IT is positively related to performance. |
| Menor and Roth (2008) | *Production & Operations Management* | Variance (cross-sectional) research, NSD program. 166 retail banks. | - NSD competence is conceptualized as a reflective second-order construct, which is manifested by four first-order (latent) dimensions. These are:  
  - NSD process focus;  
  - Market acuity;  
  - NSD strategy; and  
  - IT experience.  
- Using structural equation modeling and survey data from 166 retail banks, they show that the four hypothesized first-order dimensions are statistically significant in defining NSD competence.  
- Moreover, they demonstrate the positive effect of NSD competence on new service development performance and show that NSD competence is also significantly related to business-level performance. |
### Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
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<tr>
<th>Study</th>
<th>Journal</th>
<th>Research Design</th>
<th>Sample</th>
<th>Findings</th>
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</table>
- The firm.  
- 434 Spanish SMEs operating in several sectors (agriculture, industry, building, and services). | - EO has no direct relation to growth.  
- The greater the firm’s EO: (1) the more likely it will engage in a prospector strategy; (2) the greater the degree it will launch new products and technologies; and (3) the greater the degree it will pay attention to new needs and markets.  
- Prospector firms: (1) are more likely to launch new products; and (2) have a high rate of growth.  
- Expansion based on attention to needs and markets will lead to a high rate of growth.  
- Idle resources moderates: (1) the strategy-growth relationship; and (2) the expansion based on new products and technology-growth relationship.  
- Environmental hostility moderates: (1) the expansion based on new products and technology-growth relationship; and (2) the expansion based on new needs and markets-growth relationship. | **Entrepreneurship:** To examine the EO-growth relationship through the mediating role of three variables (prospector strategy, expansion based on new products and technology, and expansion based on attention to new needs and markets) and the moderating role of two variables (idle resources, and environmental dynamism and hostility). |
| Ellonen et al. (2009) | *Technovation* | - Qualitative (comparative case study) research.  
- Two levels of analysis: (1) the firm; and (2) online product innovation.  
- 4 firms from the Scandinavian publishing industry. | - Firms that have relatively strong dynamic capabilities in all three areas (sensing, seizing, and reconfiguration) seem to produce innovations that combine their existing capabilities on either the market or the technology dimension with new capabilities on the other dimension thus resulting in niche creation and revolutionary type innovations. (Please note that, according to their innovation typology, niche creation leads only to marketing discontinuity while revolutionary innovation leads only to technological discontinuity.)  
- On the other hand, firms with a weaker or more one-sided set of dynamic capabilities seem to produce more radical innovations (architectural in their terminology) requiring both new market and technological capabilities.  
- The explanation of the first finding is that firms with strong dynamic capabilities intentionally choose to produce innovations relying on (and leveraging of) some of their current strengths and to avoid radical innovations that would disrupt both marketing and technological capabilities. The main explanation of the latter finding is that firms that lack strong reconfiguring capabilities are unable to utilize their existing capabilities when developing new innovations. Thus, their innovations disrupt their established marketing and technological practices, and require the accumulation of new market and technical capabilities. In other words, firms with weak reconfiguring capabilities are forced to to pursue radical innovations, and thus to accumulate new marketing and technological capabilities. | **Technovation:** To explore the relationship between the firm’s portfolio of dynamic capabilities (sensing, seizing, and reconfiguring) and different types of online product innovations (architectural, niche creation, revolutionary, and regular). 

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<p>| 107 |</p>
<table>
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<tr>
<th>Author(s)</th>
<th>Journal</th>
<th>Description</th>
<th>Model/Model Components</th>
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| den Herog et al. (2010) | *Journal of Service Management* | To develop a comprehensive model for assessing dimensions of service innovations, and to draw on the dynamic capability-based view to develop a conceptual framework for managing service innovation. | -Six dynamic service innovation capabilities required to managing service innovation in a sustained way are identified. These are:  
- Signalling user needs and technological options;  
- Conceptualizing;  
- (Un-)bundling capability (more akin to architectural innovation capability);  
- Co-designing, co-producing, and orchestrating (managing service innovation across the boundaries of the individual firm and managing and engaging in networks);  
- Scaling up and replicating successful innovation and stretching the core service offering; and  
- Learning and adapting (a second-order or meta-capability, which refers to the ability to learn and document successful and failed innovation practices and adapt the overall service innovation process). |
| Salunke et al. (2011) | *Industrial Marketing Management* | To draw on the dynamic capability-based view to develop a theoretical model capturing key antecedent factors driving the service innovation-based competitive advantage in the project-oriented service firms. | -The key drivers of sustained competitive advantage are:  
- Service entrepreneurship;  
- Dynamic episodic learning capability;  
- Dynamic relational learning capability;  
- Dynamic client-focused learning capability;  
- Dynamic combinative capability;  
- Incremental and radical service innovation.  
- Propositions:  
- Propositions 1-4: the intensity of service entrepreneurship is positively related to the four types of dynamic capabilities;  
- Propositions 5-8: the four types of dynamic capabilities are positively related to (incremental and radical) service innovation; and  
- Proposition 9: (incremental and radical) service innovation is positively related to sustained competitive advantage. |
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<th>Source: Story et al. (2011)</th>
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<tr>
<td><strong>Industrial Marketing Management</strong></td>
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<td>- To examine how networks support the development of <strong>RIs</strong>, focusing on when and how network partners become involved and how their role performances support the development of four RI capabilities.</td>
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<tr>
<td>- Qualitative (case study) research.</td>
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<tr>
<td>- The RI project.</td>
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<td>- 5 RI projects undertaken in the automotive industry.</td>
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- Five task-oriented roles (articulating, funding, developing, prototyping, producing) and three network-oriented roles (connecting, integrating, endorsing) are uncovered and the performance of these roles supports the development of different project capabilities, with some roles being exclusively connected with particular capabilities and others supporting several capabilities.

- RI is suggested to be developed through four distinctive phases that require the development of four distinctive capabilities.
  - Discovery capability (the roles of articulating, funding, and, to a lesser degree, connecting support the accumulation of the discovery capability);
  - Incubation capability (although the roles of articulating, funding, and connecting continue to be important for accumulating the incubation capability, they are not sufficient. The roles of integrating and prototyping are essential);
  - Acceleration capability (the roles of developing, prototyping, producing, connecting and integrating, with additional input from end-users as well as actors performing endorsing roles are essential).
  - Commercialization capability (Producing and endorsing roles are the primary roles in commercialization, with continued but less central support from actors performing other roles, e.g. funding, developing, and integrating).

Source: Self.
From a methodological point of view, the previous table shows that past research has employed different methodological approaches when studying the drivers (determinants, capabilities, and competences) of (radical) innovation in both the industrial and service contexts. Out of the 29 articles reviewed in table 4.1, conceptual studies are found to represent nearly 7 percent (2 out of 29) of the studies, qualitative studies are found to represent nearly 31 percent (9 out of 29), and quantitative studies are found to represent nearly 62 percent (18 out of 29) of the studies. In fact, these three methodological approaches play crucial roles in the theory life cycle. For example, conceptual studies may benefit in reformulating or even initiating new theories, especially if they seek to integrate different perspective(s) or create more diverse though trials based on counter perspectives (Weick, 1989). Qualitative studies also represent a major source of theory building through the creation of new constructs and the generation of propositions linking these constructs. Through a variety of flexible research designs, these studies enrich our understanding by exploring and investigating phenomena. They can provide thick or thorough abstraction or description for phenomena, and they are particularly important if the knowledge base of the subject is “novel” or “poor” and crucial research questions have remained unaddressed. Quantitative studies also play crucial role in the theory cycle. Although they may involve a low level of theory building due to the methodological stricture, they provide “interim struggles” that can help scholars forward toward stronger theories (Colquitt and Zapata-Phelan, 2007: 1282; Eisenhardt and Graebner, 2007; Robson, 2011; Yin, 2009).

From a technical point of view, past research has contributed to our knowledge in several ways. First, the majority of past research has taken into consideration the multi-dimensional nature of innovation. That is innovation is not only restricted to product/service, but may also include other dimensions, like process innovation. Second, quantitative studies have sought to discover the critical success factors of an organization’s propensity to innovate. When doing so, these studies have sought to encompass many individual, organizational, and environmental variables. Third, studies sought to address both incremental and radical innovation (e.g., de Brentani, 2001; Salomo, et al., 2007), has shown that the drivers of the former differ from the drivers of the latter, in both the industrial and service context. While it is true that there are global drivers, it is also true that there are drivers specific to radical innovations. Fourth, past research also has sought to investigate the organizational
propensity to innovate from different perspectives and by incorporating different theories. For example, a well known issue of the critical success factor studies is that, while the influence of many determinants are investigated, there is significant interaction among these determinants. In this respect, very little attention has been paid to, and thus very little is known about how these determinates interact (Bryson and Bromiley, 1993; Van de Ven and Poole, 2005; Wolfe, 1994). By incorporating several strategic management views (e.g., the knowledge-based view), innovation scholars have begun to recognize the complex nature of these drivers and to introduce new theoretical constructs, like core NPD capability and NSD competence, which, in fact, are found to be a manifestation of lower-order capabilities that are mutually reinforce each other. Despite the significant contribution produced by past research, several gaps and deficiencies exist, as shown below.

**A lack of research that examines the dimensions of Core RIC in the service context**

There is a lack of research that examines the dimensions of Core Radical Innovation Competence (Core RIC) in the service context. As shown in the theory section, one major principle of the competence-based view (CBV) is that the capabilities that are interconnected and mutually reinforce each other (complementarity) need to be identified and conceptualized as dimensions underlying one superordinate theoretical construct. Moreover, past research strongly suggest that future scholars need to investigate how different types of organizational capabilities may relate to each other (e.g., Kusunoki, et al., 1998: 717; Madhavaram and Hunt, 2008). As shown in the literature review table, Leonard-Barton (1992) contributes to our knowledge in this regard. She argues that the core NPD capability is a higher-order concept manifested by four interrelated, interdependent dimensions: (1) the skills and knowledge embodied in people; (2) knowledge embedded in technical systems; (3) managerial systems; and (4) corporate culture. She, however, focuses on the core NPD as a significant driver for major industrial innovations. In this respect, past research does not either elaborate and further develop the dimensions of the core NPD competence, or extend this concept to radical innovation in the service context. (Please note that Menor and Roth (2008) find that NSD competence is manifested by four first-order (latent) dimensions: (1) NSD process focus; (2) market acuity; (3) NSD strategy; and (4) IT experience. There is no contradiction between the core NPD capability and NSD competences as the former concept captures the capabilities critical to major industrial
innovations while the latter concept captures the capabilities critical to incremental service innovations.

Furthermore, I find inconsistency when conceptualizing complementary resources. The work of Leonard-Barton (1992) and Menor and Roth (2008) are consistent with the theory. They theoretically argue that a set of capabilities are complementary and conceptualize these capabilities as dimensions underlying one superordinate theoretical construct (factor view rather than composite view). Contrarily to the theory, Ritter and Gemünden (2004) and Dibrell et al. (2008) argue theoretically that two competences are complementary but conceptualize them as distinct (multiple) constructs, while Pavlou and Sawy (2006) argue theoretically that a set of competences are complementary but conceptualize them as formative constructs (composite view). I will address this gap in Chapter 5. That is the relevant literature will be discussed in-depth to explore the capabilities and strategic resources underlying the Core Radical Innovation Competence (Core RIC).

A lack of research that examines the dimensions of entrepreneurial capability

There is a lack of research that examines the dimensions of entrepreneurial (resource building) capability seeking to create the Core RIC. As shown in the theory section, another major principle of the CBV is that entrepreneurial executives and strategic managers are responsible for constructing core competences and strategic resources (e.g., Core RIC). As shown in the literature review table, the majority of studies do not address the role of strategic managers in building the capabilities underlying the Core RIC. Two studies address the role of EO. In their variance (cross-sectional) study of SMEs, Moreno and Casillas (2008) draw on the entrepreneurship literature when addressing the the EO-growth relationship through the mediating role of three variables (e.g, strategy). In this respect, EO is conceptualized to reflect three characteristics: innovativeness, proactiveness, and risk taking. In their qualitative study of 13 project-oriented (business-to-business) firms, Salunke et al. (2011) elaborate on the dynamic capability-based view when addressing the relationship between service entrepreneurship and four dynamic capabilities that drive incremental and radical service innovation. In this respect, EO is conceptualized to reflect four characteristics: innovativeness, proactiveness, risk taking, and adaptiveness.
While the two previous studies respond to early calls made by notable scholar to address the variables mediating the relationship between specific EO attributes and performance, two main issues persist. First, the first study does not draw on any resource-based view. However, it is well established that incorporating a resource-based view is essential when identifying the real sources of superior performance. The second study, on the other hand, identifies the drivers of both incremental and radical innovation. However, it is well established that there are drivers specific to radical innovation, and there is a significant need to developing contingent frameworks rather than normative ones. Second, none of the two studies is longitudinal and thus the process by which resources are accumulated is still in a black box. As argued by several scholars (e.g., Van de Ven, 1992; Van de Ven, 2007; Van de Ven and Poole, 1990), such research is eligible to open the black box of resource accumulation by investigating the processes by which strategic managers built strategic resources, and would allow the creation of the entrepreneurial capability required to build such a complex resource. In fact, the process by which strategic resources is accumulated is identified as a black box. For example, Sirmon et al. (2007: 274) argue that “the processes by which firms obtain or develop, combine, and leverage resources to create and maintain competitive advantages are not well understood”. Ellonen et al. (2009) state that longitudinal studies on innovations and capabilities and their coevolution would be valuable, especially that the accumulation of dynamic capabilities seems to be strongly path-dependent.

Thus, the role played by the strategic managers in building the Core RIC is ignored, and thus the dimensions of the entrepreneurial (resource building) capability required to build such a complex resource are left uninvestigated. In fact, several scholars (e.g., Greene, et al., 1999; Maidique, 1980; Newbert, 2007; Priem and Butler, 2001a) have noted that the majority of the relevant literature of innovation, strategic management and entrepreneurship have focused on the role of senior managers in resource deployment and allocation rather than resource creation, and thus the accumulation process has been considered as a black box. More specifically, the majority of past research has examined the role of executive champions as key drivers for (radical) product innovation during the innovation project, but neglects the role of executives in accumulating and building the
capabilities and competences underlying the Core RIC that will drive radical innovation project.

For example, in the innovation and marketing literature, Zirger and Maidique (1990) find that top management support during the whole NPD process is a key to the success of technological innovation. Drew (1995) finds that insufficient senior management support is a major barrier for faster NPD in the financial service industry. Chandy and Tellis (1998) find that the existence of strong product champion has a positive impact on the willingness to cannibalize existing assets and routines, which is a key predictor of an organization’s propensity for radical product innovations. de Brentani (2001) find that the active involvement of senior managers in the role of visionary and mentor for new service development is a key for radical innovation success. Sethi (2001) finds that monitoring of the project by senior management leads to a greater degree of product innovativeness. O'Connor et al. (2002) highlight the important role played by the senior manager of the SBU, which will receive the radical innovation form the R&D team, in pulling the innovation and leveraging the unit capabilities to suit the requirement of the innovation. Harborne and Johne (2003) investigate the leadership practices during the development projects followed by both incumbents and new entrants. They find that, in successful development projects, a network of (senior, business, and project) leaders, within the incumbent financial institutions, create “project micro-climates” which are quite different from the prevailing business climate, and create culture that promote information sharing, team working, and innovation. These micro-climates are similar to the climate of new entrants (informal, team-based and entrepreneurial rather than formalized, hierarchical, and risk averse). Finally, Cooper and Kleinschmidt (2007) find that the senior management commitment for and involvement in new products, and its accountability for new product results are key to NPD success.

In the strategic management and entrepreneurship literature, Atuahene-Gima and Ko (2001) examine the impact of four combinations of entrepreneurial orientation and marketing orientation (market/entrepreneurship firms, entrepreneurship firms, market-oriented firms, and conservative firms) on: (1) new product performance; and (2) six variables related to the product innovation process (timing of market entry, product quality,
marketing synergy, proficiency of market launch, top management support for innovation, and external environment). In this respect, the entrepreneurial orientation reflects the organization’s degree of risk-taking propensity, proactiveness, and aggressiveness with respect to the product innovation process. Wiklund and Shepherd (2003) find that the EO (innovativeness, proactiveness, and risk taking) moderates the relationship between a bundle of knowledge based resources (applicable to opportunity discovery and exploitation capabilities) and firm performance. Moreover, Moreno and Casillas (2008) find the prospector strategy variable and the expansion based innovation variable mediate the relationship between EO (innovativeness, proactiveness, and risk taking) and growth, while the availability of firm resource variable (e.g., capabilities) moderates the relationship between the two mediators and growth.

In short, the majority of past research has focused on the role of strategic leaders in deploying and allocating resources during the radical innovation projects, rather than creating the asset stocks (capabilities) underlying the Core RIC. However, according to the CBV, these capabilities are conceived as asset stocks that cannot be adjusted instantaneously and thus require a longer term approach. I will address this gap in Chapter 5. That is the relevant literature will be discussed in-depth to explore the dimensions underlying the entrepreneurial (resource building) capability.

**A lack of research that examines the capabilities of radical project management**

There is a lack of research that examines the capabilities of radical project management in the service context. Two points here deserve more attention. First, while the entrepreneurial (resource building) capability and Core RIC have been suggested to be keys to the RI success, they are not sufficient. In terms of the process, radical innovation develops through several distinctive phases. Thus, RI requires the development of several distinctive capabilities accumulated through “innovation-based corporate entrepreneurship”. Second, the development process for incremental innovation is fundamentally different from the development process of radical innovation (e.g., O'Connor and DeMartino, 2006; Story, et al., 2011).
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For example, in their quantitative studies, de Brentani (2001) and Salomo et al. (2007) find that the true and tried, well-recognized project management techniques such as Stage-Gate system and formal, highly structured processes are significant predictors for incremental innovation success. They, however, are not significant in explaining radical innovation success. In a similar vein, past qualitative research (e.g., O'Connor and DeMartino, 2006; Story, et al., 2011; Veryzer, 1998) sought to address the process of generating and adopting radical innovations in the industrial contexts, find that the activities associated with the development of continuous innovations are rarely possible and not constructive during the early development of radical innovation, and may discourage major innovations. The main reasons identified are that there is an extremely high degree of technical and market uncertainties. Moreover, O'Connor et al. (2002) also find that the well-recognized Stage-Gate system is not relevant in the late phases of the project due to the residual technological and market uncertainties. All these innovation scholars state that while considerable knowledge has been accumulated about incremental or continuous innovation, there has been very little research focused on radical innovation. As a result, we know considerably less about the effective management of the new product development process in the radical than in an incremental context. Thus, they suggest that more longitudinal research is needed to understand the tools and techniques used when managing radical innovation, in both the industrial and service context.

It should be noted, however, that all the intensive studies reviewed have focused on radical industrial innovation, and there is has been a lack of intensive research addressing the same phenomena within the service context. Thus, the extent to which these project management capability frameworks are applicable to service innovation is an empirical question. Furthermore, the discovery-incubation-acceleration capability frameworks of project management capability developed in the industrial context have been mainly descriptive, and there is a lack of research that seeks to further develop these capability constructs by examining their lower-order dimensions. Of particular importance is the incubation phase. O'Connor and DeMartino (2006) state that teams are found to struggle with many technical and market uncertainties during the incubation stage. The majority of radical innovators lack a mature incubation capability, and thus incubation appears to be the most fragile and least understood of the three capabilities. In other words, incubation is the biggest
challenge for the firms as a whole. As such, a number of firms moved projects from
discovery to acceleration while ignoring the experimental business activity of incubation
that could expand the opportunity space. The previous findings, thus, points out to
undertaking further research in the incubation phase.

While there is only one study (Morris and Westbrook, 1996) sought to address the
management of radical technological innovation in the service context, it focuses mainly on
radical innovation adoption, not generation and adoption. However, recent research (e.g.,
Damanpour and Wischnevsky, 2006) calls for examining the capabilities required for both
generating and adopting innovation. Moreover, in their conceptual article, den Hertog et al.
(2010) draw on the dynamic capability-based view to develop a conceptual framework for
managing service innovation. However, their conceptual framework neglects the incubation
capability (the tools and techniques required to reduce the technical and market
uncertainties). I will address this gap in Chapter 5. That is the relevant literature will be
discussed in-depth to explore the dimensions underlying the discovery-incubation-
acceleration capability framework of radical innovation project management.

A lack of an integrative (evolutionary) conceptual framework
There is a lack of an integrative conceptual framework that addresses the interrelationships
among the drivers (capabilities and competences), and links these drivers to radical
innovation success. In fact, several scholars have called for developing such a
comprehensive (evolutionary) framework. For example, Nelson and Winter (1977: 41)
argue that a useful theory of innovation must be “wide enough to encompass and link the
relevant variables and their effects”. That is a useful theory of innovation should enable us
to “knit together and give structure to what we know and extend our knowledge beyond
particular [“semi-isolated”] facts” and the many “disjoint theoretical frameworks”, which
does not “tie together the various pieces to achieve an integrated broader perspective”.

Moreover, such an integrative conceptual framework must take into consideration the
evolutionary nature of innovation. Lengnick-Hall (1992: 425) calls for developing
evolutionary (causal), integrative conceptual frameworks for corporate entrepreneurship
capturing the interaction between: the way by which corporate competences are configured;
innovation; and competitive advantage. Moreover, she states that these conceptual models “must be articulated in such a way that can be subjected to empirical investigation”. Chandy and Tellis (1998) state that we do not have a unifying framework yet that explains how organizational factors, capabilities, and competencies affect radical innovation performance. Herrmann, et al. (2006) state that considerable research is required if further light is to be shed on the determinants of RI and the interrelationships among them, and their relationships to performance. Veryzer (1998: 320) states that “exploring the relationship between commercialization phase [acceleration capability] and the success of radical innovation should be examined” by future research. Moreover, O'Connor and DeMartino (2006) state that future theoretical and applied research should examine the way by which the discovery-incubation-acceleration capability framework interact with other levers of RI to develop the complete array of RI capabilities and competences. Salomo et al. (2007) state that it may be a valuable approach for future research to employ a longitudinal research design to detect potential mediators (NPD management activities, e.g., how to generate market information during development or cooperate with partners to develop new technology), linking the planning activities to the final innovation outcome. In a similar vein, Salunke et al. (2011: 1260) state that there is a need for a conceptual model that captures the antecedents of service innovation-based competitive strategy from the perspective of a resource-based view, and that “this need represents a substantial void”.

**Longitudinal research is scarce despite its significant contribution**

Throughout the theory and critical review sections, several scholars call for undertaking more longitudinal research due to its ability to open the black box of resource accumulation and radical innovation project management. However, table 4.1 shows that longitudinal research is scarce, and cross-section research dominates. Nearly 16 percent of the studies are found to employ longitudinal research designs, and *none of them has been undertaken in the service context*. However, nearly 62 percent of the studies reviewed are found to be variance (cross-sectional) studies. These studies employ survey research designs. It is generally described as being *inherently static*. Such static orientation rules out the influence of causes operating across greatly different time scales, and sequences of events that chain together to lead up to some outcome (Van de Ven and Poole, 2005; Wolfe, 1994). The static orientation does not open the process black box for practitioners and academics.
Mowery and Rosenberg (1979) argue that the “the black-box approach of surveys”, seeking to examine the determinants of innovation outputs, is an oversimplification. A more fruitful approach is to longitudinally investigate the processes leading to the innovation outputs. Lazonick (1994: 245-247) rejects the view that innovation needs to be studied using a static methodology, as this, in fact, “separates theory form reality”. The static methodology denies the importance of studying innovation as an “evolutionary process”. Thus, a scholar, who wants to drive general theoretical principles of how innovation occurs, needs to study the actual process of innovation at different times to be able to relate his theoretical focus on innovation to reality. Priem and Butler (2001a: 34) argue that separating theory from reality reduces the “operational validity” of research, one necessary (but not sufficient) condition for managerially relevant research. That is because cross-sectional approaches may result in “causal hows and whys remaining in a black box”. Table 4.2 summarizes the major advantages and disadvantages of longitudinal research based on process data.
### Table 4.2: The Advantages of Longitudinal Research (based on Process Data)

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Opening the proverbial black box</td>
<td>It has the ability to capture the messiness of resource accumulation and innovation activities and structure them as they unfold in reality (Langley, 1999; Wolfe, 1994). Taking into consideration the messy nature of activities, longitudinal research based on process data has the ability to open the black box of the radical innovation journey, and provide a road map for the innovation and developmental managers (Robson, 2011; Van de Ven, 2007; Van de Ven and Poole, 1990).</td>
</tr>
<tr>
<td>The creation of new constructs and variables</td>
<td>Capabilities are exercised through organizational processes, and thus capabilities and processes are closely entwined (Day, 1994: 38; Kogut and Zander, 1992: 387; Li and Calantone, 1998: 14). Thus, process research enables scholars to develop new variables and constructs that could “only be detected” through “close contact with real processes”. In other words, a detailed process data can lead to more meaningful and potentially more powerful explanatory variables and constructs for “nomothetic research” than the dominant questionnaire-based studies (Langley, 1999; Wolfe, 1994).</td>
</tr>
<tr>
<td>Providing a high level of explanation</td>
<td>Opening the black box provides a high level of explanation through the identification of causal links involved in the processes. That is because the causal links are more explicitly traceable. Also, longitudinal research can take into consideration not only “immediate causation” (as assumed in variance research), but also “distal” causation. In other words, this processual worldview takes the time ordering of independent events seriously, allowing explanations to be “layered and incorporate both immediate and distal causation” when explaining innovation performance. Thus, building theory from process data yields “a more holistic appreciation of complex organizational dynamics” (Langley, 1999; Robson, 2011; Van de Ven and Poole, 1990; Wolfe, 1994). As such, “longitudinal research and analysis could add a new dimension of understanding to the many cross-sectional replications that have already been conducted” (Montoya-Weiss and Calantone, 1994: 415).</td>
</tr>
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<table>
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<tr>
<th>Disadvantages</th>
<th>Explanation</th>
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<tr>
<td>Data asphyxiation</td>
<td>Process data is huge in volume, missy in nature, and some important events are left undocumented. Moreover, conducting such studies is very labor-intensive, and typically involves the collection of large amounts of multifaceted data (e.g., data about the events and choices, and data about the context of the processes) so that the research is in danger of “data asphyxiation” (Langley, 1999; Van de Ven, 2007; Van de Ven and Poole, 2005; Wolfe, 1994).</td>
</tr>
<tr>
<td>Less well developed methods</td>
<td>Methods for developing theories from process data are less well developed and “far from simple” (Langley, 1999; Van de Ven, 2007; Van de Ven and Huber, 1990; Van de Ven and Poole, 2005; Wolfe, 1994).</td>
</tr>
<tr>
<td>Less familiarity with events</td>
<td>Events are conceptual entities that researchers are less familiar with as most researchers have been taught a version of variance modeling (Langley, 1999; Van de Ven, 2007; Van de Ven and Poole, 2005; Wolfe, 1994). In this respect, it might be difficult for these researchers to adopt the processual worldview as “variance thinking and process thinking” represents two different “mental models” for thinking about the world (Robson, 2011: 47).</td>
</tr>
<tr>
<td>Time consuming</td>
<td>Longitudinal research usually requires longer time period than cross-sectional research (Saunders, et al., 2009: 155).</td>
</tr>
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</table>

Source: Self.

In short, while past variance research has broaden our understanding of innovation and has offered good pictures of the antecedents to and consequences of innovation in organization, there is a lack of longitudinal qualitative research that would bring significant contribution to our knowledge, especially the creation of new constructs, and the development of propositions linking these constructs. Unfortunately, despite the contribution that would be brought to our knowledge by employing longitudinal research designs, variance research dominates the literature of organizational change, innovation, and entrepreneurship, and longitudinal research (based on process data) remains one of the least adopted approaches (Kraaijenbrink, et al., 2010; Priem and Butler, 2001a; e.g., Robson, 2011; Tsoukas and
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**Service innovation research is still largely based on a manufacturing mindset**

A close examination to the (qualitative and quantitative) empirical studies reviewed in table 4.1 reveals that nearly 70 percent (19 out of 27) of the studies have focused on (incremental and radical) *industrial* innovations. Thus, less than third of the studies reviewed concerns service innovation. This finding is consistent with previous research. For example, den Hertog, *et al.* (2010: 492) state that “too often the innovation literature has taken more limited views by focusing on technological innovations”. Moreover, I find that some key quantitative studies conducted in the service industries are grounded on earlier studies undertaken in the manufacturing context (replication). A notable example is the work of Cooper, *et al.* (1994). This study is, to a large extent, an adaptation of the work of Cooper (1979), who develops a conceptual model of new product outcomes based on “project NewProd, whose goal was to identify the determinants of commercial success in industrial product innovation”. This finding is consistent with past research. Several scholars (e.g., Salunke, *et al.*, 2011; Sirilli and Evangelista, 1998) assert that, while service innovation is distinct from manufacturing innovation, service innovation research is still largely based on a manufacturing mindset.

**The resource-based perspectives are underutilized in the service context**

I find that only 30 percent (3 out of 10) of the studies focused on service innovation adopts a resource-based view. This suggests that the resource-based perspectives are underutilized in the service context. In a similar vein, den Hertog et al. (2010) state The literature of (dynamic) capabilities tend to be manufacturing-oriented, and very little research has been undertaken in the service context. Thus, the potential of a combined service innovation management/capability view of the firm is still underutilized and offers many promising avenues for further research. They also state that that adopting a resource-based view may result in promising conceptual frameworks for the strategic management of service innovation. In other words, adopting a resource-based view presents a promising future research avenues.
Inaccuracy in measuring the degree of innovativeness

In Chapter 3, I highlighted three major deficiencies plague most innovation typologies. Of particular importance is the misclassification of the degree of innovativeness. By closely examining the literature reviewed in table 4.1, I identify the inaccuracy in measuring the degree of innovativeness as one criticism for many quantitative studies. I will take the study of de Brentani (2001: 175), one important work in the radical service innovation literature, as an example. This study categorizes innovation projects into “discontinuous [“or radical”] innovations” (64 projects investigated), and “incremental innovations” (84 projects investigated). In this respect, discontinuous innovation is identified as products/services that are: (1) totally new to the market (“service is highly innovative, nothing like it on the market, replaces vastly inferior service”); (2) and are based on totally new technology to the firm (“the new service exploited technology that was totally new to the firm”). The operationalization of the degree of innovativeness, in fact, suffers from self-report and single informant bias.

In the self-selection and single informant bias, newness has been left as an empirical question for managers (e.g., Brown and Eisenhardt, 1995; Damanpour and Wischnevsky, 2006; Kusunoki, et al., 1998; Sorescu, et al., 2003). The degree of innovativeness (based on the technological and market newness) is evaluated by managers using Likert Scale. However, “this type of data potentially suffers from self-report bias in measuring innovation. . . . Innovation is a desirable outcome, and managers may, consciously or unconsciously, believe there is a need to appear more innovative than they really are”. In other words, identifying the degree of innovativeness (e.g., “how to determine whether an innovation is truly radical”) is one of the most fundamental problems in survey research (Gatignon, et al., 2002; Sorescu, et al., 2003: 83). While few scholars (e.g., Dewar and Dutton, 1986) have sought to manage this problem by hiring a panel of industry expert to classify the innovations to incremental and radical, Dahlin and Behrens (2005) argue that this method in identifying radical innovation also suffers from success bias. This may explain why the number of discontinuous innovations investigated by de Brentani (2001) was noticeably high (43%), although this type of innovations in all radical innovation research ranges between 7% (Sorescu, et al., 2003) and 20% (Garcia and Calantone, 2002).
All in all, I have critically reviewed past research in organizational led innovation, and identified eight gaps and deficiencies. The current research project is intended to fill in all the previous gaps and deficiencies. In Chapter 5, I will discuss in-depth the dimensions of: (1) Core RIC; (2) entrepreneurial (resource building) capability; and (3) the discovery-incubation-acceleration capabilities of radical innovation project management. Moreover, the interrelationships among these theoretical constructs and their relationships to radical innovation success/performance will be suggested. This satisfies gaps 1-4. Gaps 5-6 are empirical questions. I will respond to these gaps by qualitatively and longitudinally investigating this integrative conceptual framework in the financial service context. Gap 7 is actually addressed theoretically. As shown in the theory and critical review sections, the current research project adopts the major principles of the CBV of the firm. Gap 8 is theoretically addressed in Chapter 3, which shows that the current research project adopts the characteristics-based approach. As shown in table 3.5, this integrative approach is considered as a powerful tool in detecting technical change, and thus has the ability to overcome the issue of misclassification of the degree of innovativeness. Moreover, any innovation project empirically investigated will be evaluated against the innovation modes discussed under this approach. Having discussed the key internal drivers, I will now turn to critically reviewing past research in market led innovation.

4.1.2 Market-led Innovation

Two groups of external drivers will be discussed. The former group will focus on two main actors: customers; and suppliers and partners. The latter group will focus on innovation trajectories observed in service industries.

4.1.2.1 Customer-oriented Innovation

Customers’ requirements and preferences are changing, and this is considered as one main driver of service innovation. Moreover, research has shown that firms that are marketing-oriented are more likely to gain ideas, information, and suggestions that do not only stimulate innovation, but also enhance the innovation activity itself (Drew, 1995; Gruner and Homburg, 2000; Kristensson et al., 2004). For example, Djellal and Gallouj (2001) find that 76% of the innovating service firms in their sample identify clients as the main source of innovation or ideas for innovation. As such, customer involvement in the
innovation activity has become a fertile area of research. Jeppesen (2005: 349) defines customer involvement in innovation initiatives as “the level to which users are allowed to influence the development of a product”.

Several scholars have investigated the level of customer participation and the roles these customers play in the development activity. For example, Alam (2002), in a multiple-case-study research, identified four intensity continuum and six modes of user involvement. The intensity continuum included: (1) passive acquisition of input; (2) information and feedback on specific issues; (3) extensive consultation with users; and (4) representation. The modes of involvement included: (1) face-to-face interviews; (2) user visit and meetings; (3) brainstorming; (4) users’ observation and feedback; (5) phone, faxes, and e-mails; and (6) focus group discussions. However, he does not link these levels of intensity to different types of innovations (e.g., radical vs. incremental). Nambisan (2002), in a conceptual research, identifies three roles played by customers in NPD in the context of virtual environments. These roles are: (1) customer as a resource, playing pivotal role in the stage of idea generation and product conceptualization; (2) customer as a co-creator, playing valuable roles in the stage of product design and development; and (3) customer as a user, playing valuable roles in testing the product (product testers) and providing support for other peer users (product supporter). The first role deserves more attention as there is a debate regarding the customer role in the ideation stage.

von Hippel (1986: 791) argues that customers need to play a pivotal role in this stage. He introduces the concept of “lead user”, who is characterized by: (1) “present strong needs that will become general in a marketplace months or years in the future”; and (2) “often attempt to fill the needs they experience” through providing new product concepts as a solution to those needs. Zirger and Maidique (1990: 880) find that innovating organizations have frequent interactions with these “trend setters” in their industry as these lead users could provide insightful and innovative suggestions during product development. Chandy and Tellis (1998) find that a strong orientation to current customer led to less radical innovations. Thus, radical innovator should ignore their current customers, and should pay attention to future customers or the future needs and actions of current customer. That is because being customer-oriented will reduce willingness to cannibalize, which is a key
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driver of radical innovation. In other words, listening closely to current customers actually might mislead and hurt radical innovators as customers of the future frequently have different needs and wants than current customers. Lukas and Ferrell (2000) find that a greater emphasis on customer orientation increases the introduction of radical new products and reduces the number of me-too products launched. One explanation provided is that more customers are well informed, and have high expectations. Alam (2002: 258) identifies a comprehensive list of activities played by customers in ten-stage NSD process. He finds that customers have no role only in the first step of the model (strategic planning). Moreover, customers play essential roles in the idea generation stage (e.g., state needs, problems, and their solutions) and idea screening stage (e.g. suggest rough guide to sales and market size, provide reactions to the concepts, help the producer in go/no-go decision). Oliveira and von Hippel (2011) extend the concept of lead user to the banking sector. They find that 44% of today’s important computerized retail banking service innovations is first developed by lead users themselves prior to banks or other types of financial service producers offered them commercially.

Contrarily to the previous, several scholars adopt a very different position. They argue that customers are excellent source of innovation only in case of continuous innovation, in which both technology and market are mature. However, end customers play a very limited role in the ideation stage. I believe, however, that structuring the argument to follow the discovery-incubation-acceleration capability frameworks, which are developed by O'Connor and DeMartino (2006) and Story et al. (2011) and presented in table 4.1, is valuable in identifying the customer roles in the several stages of RI development.

In the discovery stage, the opportunity is created or recognized, elaborated, and articulated by the entrepreneurial firm (e.g., O'Connor and DeMartino, 2006; Story, et al., 2011). In this stage, as both technology and market are evolving, customer participation in the idea generation stage will simply lead to imitative, unimaginative products (Nambisan, 2002). That is because: “consumers’ tastes are formed by the range of commodities which are available to them or, at least, about which they know” (Penrose, 1959: 80); and “customers are notoriously lacking in foresight” (Hamel and Prahalad, 1994: 99).
In this respect, a set of quantitative and qualitative studies provide support for the claim that neither customers are important source for breakthrough ideas, nor the traditional marketing research techniques are useful in this stage. For example, McDermott and O'Connor (2002) find that none of the twelve radical innovation projects investigated are in response to a customer response, which is a major theme differentiating radical from in incremental innovation projects. Veryzer (1998) argues that conventional market research techniques, along with reliance on lead users early on in the process, may be of little help in the formulation and early development of radical innovation due to the lack of experience of and the ability to envision the potential of the radical innovative product. Thus, he conclude that the development process is characterized as being more technology driven rather than customer driven, and more exploratory with the early use of prototyping and experimentation. Lynn et al. (1996: 13) investigate the development process of four breakthrough industrial innovations, and conclude that “much” of the information gathered through conventional market research techniques (e.g., concept testing, customer surveys, conjoint analysis, and focus groups) is “misleading”, and “almost none” has a significant impact on the development of these innovations. Nambisan (2002) argues that these structured techniques are less useful in importing customer knowledge, and severely limit richness and frequency of customer contribution to the idea generation. Kristensson, et al. (2004) argue that these techniques only manage to skim the surface of user needs and desires. Callahan and Lasry (2004) find that end-user input in NPD increases up to a certain point but then decreases for radical new products. Ordanini and Parasuraman (2011) find that collaboration with customers during the development process helps in generating only a high number of incremental new service ideas that do not represent radical departures from current service offerings.

In the incubation stage (due to the extremely high level of technical and marketing uncertainties), prototyping, experimenting and testing assumptions, and accumulating step-functional learning are essential to maturing the RI opportunity into a business proposal (McDermott and O'Connor, 2002; O'Connor and DeMartino, 2006; Salomo, et al., 2007; Story, et al., 2011; Veryzer, 1998). Customer involvement is crucial in this regard. Lynn et al. (1996: 15) call this technique going live to “probe-and-learn”, which represents a more proactive form of customer involvement. They argue that developing a prototype (even
crude one) and moving from one market (segment) to another market (segment) is essential to experiment and learn with customer. It is only by this way of probing and mutual learning that customer can understand, imagine, and contribute the development of RI generation. In a similar vein, O’Connor (1998) finds that working with customers as developing partners and probing and learning represent a useful mechanism when learning about the markets of breakthrough innovations. von Hippel (1994: 434) Thomke and von Hippel (2002) calls this the “rapid prototyping method” that has the ability to capture the “sticky information” related to the customer latent needs. They argue that when the innovation seeks to meet latent needs, the locus of information required to produce the innovation will be partitioned among several actors, including the potential customers. However, as this information has a sticky nature (tacit), they are very difficult and costly to capture. Here, potential customers need the experience the reality to be able to be able to understand, try, modify, and contribute. This could be done quickly and easily by developing inexpensive, working model, and delivering it to customers. In short, as the potential customers share the locus of (need) information, they also should share the locus of innovation.

The notion of experimentation by going live is not limited to industrial innovation. Thomke (2003) finds that Bank of America has been running a series of formal, live experiments to learn from customers and generate new ideas. Carbonell et al. (2009) argue that if multiple technical and market uncertainties exist, these uncertainties will create inefficiencies in the development process. In this respect, customer involvement can enable the development team in resolving many of these uncertainties.

In the acceleration stage, the majority of RI studies find that customer also play an important role. For example, Veryzer (1998) finds that the development efforts shift from focusing on the technical advantage to reflect more of a customer benefit orientation. Marketing activities such as customer trails and the development of marketing plans are undertaken and play an important role in shaping the refined product. Moreover, Story, et al. (2011) find that the acceleration and commercialization competences involve strong interaction with (test) end customers to refine and review the product.
Finally, the previous discussion has only covered the customer oriented and led innovation. A third type, however, needs to be briefly discussed. It is the customer focused innovation. In the service innovation literature, this innovation is called “ad hoc innovation” or “fully customized innovation”. Ad hoc innovation is distinguished from “adapted customized innovation”, which belongs to the incremental mode of innovation discussed in Chapter 3. Ad hoc innovation is an interactive (social) construction of a solution to a specific problem posed by a given client. This innovation is produced jointly by the service provider and the client, and as such is considered as a product of the provider/client interface. The existence of this interface may limit the reproducibility of this solution. However, the reproducibility of a solution is an essential feature to be considered as an innovation. This solution should be (partially) codified, formalized, and reproduced to add economic value to the service provider. That is why the ad hoc concept is a “rather controversial concept”, due to the violation of reproducibility (de Vries, 2006; Drejer, 2004: 559; Gallouj and Weinstein, 1997: 549; Windrum and García-Goñi, 2008). de Vries (2006) recognizes that this customer specific solution needs to be reproduced by the service provider to be considered as an innovation. He, however, acknowledges that this specific solution still adds economic value. It adds economic value to the client by solving a specific problem that otherwise would not be solved. It also adds economic value to the service provider through opportunities for premium pricing and relationship building.

All in all, the majority of past qualitative and quantitative research (e.g., Salomo, et al., 2007; Story, et al., 2011) has shown that as the process of developing radical innovations differ from the process of developing incremental innovation, the role of customer in the former also differ. That is the RI process is more exploratory and less customer driven than the typical, incremental innovation process. It also shows that being customer oriented or led will not lead to the production of radical innovations. But, this does not mean that customer is not considered as a valuable source during the radical innovation development. In fact, a mix between entrepreneurial orientation and market orientation enhance the performance of radical innovation (Atuahene-Gima and Ko, 2001). In other words, although the majority of retail consumers are not considered as a major source of a breakthrough idea (in the discovery stage), they are still considered as a valuable source in verifying, actualizing, and enlarging this breakthrough idea into a business proposal (in the
incubation stage). In this respect, the roles of customers will be reflected in the way by which the radical innovating entity seeks to reduce the market uncertainties during the incubation stage, and refine and adapt the product/service during the acceleration (transition) stage. This is believed to fill a gap in the role of customer in the development of radical innovation in the service context. In other words, the lower-order dimensions underlying the project management capability framework will be conceptualized to reflect how and when the radical innovator seeks to incorporate the customer inputs during the RI project. Moreover, customer-focused (ad hoc) innovation will not be considered due to the lack of one major assumption of innovation, the reproducibility issue.

4.1.2.2 Supplier and Partner Led Innovation

In the networking economy, one needs to take a border network perspective as innovation research has shown that partners (e.g., IT equipment and system suppliers, universities and research and training institutes, distributors, and IT and other consultants) play crucial roles in the radical innovation journey. These networks do not only include private entities and non-governmental originations (NGOs), but also governmental and public bodies. For example, external actors, including competitors and governmental bodies, may cooperate with the would-be radical innovating firm in undertaking basic and applied research that would serve future innovation projects (Cohen and Levinthal, 1990; Djellal and Gallouj, 2001; Mowery and Rosenberg, 1979; Partanen, et al., 2011; Ritter and Gemünden, 2004; Sundbo and Gallouj, 2000; Windrum and García-Goñi, 2008).

Past research also has shown that suppliers and partners play crucial roles during the development of technological innovation in the industrial context. For example, Afuah and Bahram (1995) theoretically analyze innovations at the network level (value-added chain), and state that suppliers and partners play essential roles, especially if the radical innovator is unfamiliar with the new technology and/or market, or the radical innovation requires the introduction of complementary innovations. Whitley (2000) theoretically analyze the institutional structuring of different innovation strategies. He stresses that the knowledge base required for developing radical innovations is highly complex. He identifies two types of complexity: cognitive complexity; and organizational complexity. Radical innovation is high in cognitive complexity because the number of different kinds of scientific and
technological fields providing information for the development of radical innovation is high. This high level of cognitive complexity leads to the high level of organizational complexity, a variety of different kinds of organizational units (e.g., different departments within the radical innovator and its business partners, research institutes, and other private and public agencies) collaborating to produce such knowledge.

Moreover, Sivadas and Dwyer (2000) find that partners have a profound impact on the NPD success. These external entities enable the innovating firm to quicken the pace of innovation, overcome budgetary constraints, spread out risks, and gain access to resources and competences (e.g., technological and financial) not otherwise available to the innovating entity. McDermott and O’Connor (2002) find that outsourcing is a common practice when developing radical innovations. In their sample, they find that radical innovators engage in one form or another of alliances to reduce risk and fill (technicila and market based) competence gaps. Herrmann et al. (2006) find that forming cluster of suppliers (being a node within a very closely-knit community of suppliers) predicts the firm’s propensity to innovation radically. Story, et al. (2011), as shown in table 4.1, analyze the development of radical innovation management capabilities (discovery, incubation, acceleration, and commercialization), and find that the many suppliers and partners play essential roles in assessing the radical innovating entity when developing these capabilities. Thus, they conclude that a complex and diverse network of actors and relationships are essential for realizing RI.

Service innovation is not an exception. For example, Pennings and Harianto (1992) empirically examine major technological innovations introduced by commercial banks, and find that these banks engage in a web of linkages, especially with the IT industries, to facilitate access to extramural know-how and technologies. Moreover, recent empirical research in service innovation has highlighted a trend toward networking among several governmental bodies and NGOs not only in the development of radical innovation, but also in the introduction of bundles of products and services. For example, de Vries (2006) finds that a network of partners, possessing complementary resources, collaborate to co-design or co-produce layered offerings, bundles of products and services. Windrum and García-Goñi (2008) examine radical innovation in the health service context and reintroduce the
role of policy maker and public entities as a key agent in the innovation process. They find that radical innovations are developed and selected within a complex multi-agent environment. They also argue that, in many cases, a government may itself produce complementary goods and/or services. Finally, Ordanini and Parasuraman (2011) find that collaborating with partners in service innovation enhance a firm’s likelihood of being radical innovator.

Due to the crucial roles played by these external entities, past research in industrial and service innovation has presented some future research directions. For example, Sivadas and Dwyer (2000) state that collaboration with suppliers and partners worth studying from a dynamic, longitudinal rather than static perspective. This is especially important as the failure rate of NPD alicences is estimated to be 70 percent. de Vries (2006) calls for examining distributed innovation processes. Windrum and García-Goñi (2008) made a similar suggestion, and argue that emphasizing the radical innovator’s role and neglecting other agents captures only one part of the reality. In this respect, they highlight the importance of undertaking more inductive empirical investigation to understand the role of policy makers in radical innovations in other service contexts, and also to understand the interaction among multiple agents and the co-evolution of preferences and competences around radical innovation. Story, et al. (2011: 963) find that governments play essential roles in developing RIs. However, in the RI and entrepreneurship literature, “there is great ignorance of the role of governmental actors in supporting successful innovation”. Moreover, longitudinal research also has the ability to trace the development of innovation and provide answers for several outstanding questions. Stanko and Calantone (2011) review a number of case- and survey-based research and highlight a set of several outstanding questions such as how and when the outsourcing decision is best made in the NPD process, the impact of technological and market uncertainties has on the outsourcing decision, how the outsourced development activities are best managed once they are underway, how the relationships among the the innovating firm’ team and partners’ teams are best managed. They suggest that, to get better understanding for the previous, scholars need to examine critical components of the dyad, and not to be limited to the innovating entity. In this respect, the analytical conceptual framework (Chapter 5) and the empirical investigation
Chapter 4 Key Drivers of Radical Service Innovation Success

(Chpater Chpater 7-10) will take into consideration the outstanding research questions identified by these scholars.

It is essential, however, to clarify how the current research project will respond to the future research directions identified by the previous studies. First, none of the previous studies (with the exception of Pennings and Harianto (1992)) employes a qualitative longitudinal research design, which has the ability to trace the co-evolution of competences around innovation. As mentioned in several instances, the current research will examine the phenomenon qualitatively and longitudinally. Moreover, the essential roles played by key external entities, during the long journey of radical service innovation will be investigated. Second, while the empirical studies examining the role of external entities in the development of radical (product and service) innovations (de Vries, 2006; Story, et al., 2011; Windrum and García-Goñi, 2008) contribute significantly to our knowledge, they adopt a network perspective, not a resource-based view. Thus, in these studies, the innovation network is used as the unit of analysis. However, in any study adopting a resource-based view of competition, the unit of analysis must be a firm (e.g., the radical innovating entity as a whole, or a SBU), not a network of entities. In other words, any resource-based view is concerned with the key drivers of superior firm performance. Third, all the studies reviewed throughout this section focus on (radical) technological innovation in the industrial and service contexts. In service innovation, however, technology is just one vector among others, and there is a need to address technologies specific to services (intangible technologies, like legal, financial, actuarial, commercial, methodological, etc) (e.g., Djellal and Gallouj, 2005; Gallouj and Weinstein, 1997; Sundbo, 1997). As discussed in Chapters 1 and 2, several national and international banks had played key roles in the National Program for Vehicle Replacement (NPVR). In addition to introducing the product of vehicle replacement finance, they had been involved in developing a new-to-the-world methodology (Clean Development Mechanism-Program of Activities). Thus, while the majority of past research has been focusing on innovation based on technological trajectory, the NPVR follows what might be called social (environmental) trajectories. This brings to the discussion the several types of innovation trajectories observed in the service context.
4.1.2.3 Service Innovation Trajectories

Based on the findings of a three-year research project (SI4S), undertaken to investigate the nature of service innovation activities within 7 European countries (Denmark, France, Germany, the Netherlands, Norway, Sweden, and the UK), Sundbo and Gallouj (1998; 2000) introduce the concept of innovation system in services. This concept classifies the external driving forces into two categories: actors (e.g., customers and suppliers); and trajectories. Trajectories are “ideas and logics that are diffused through the social system (e.g., a nation, an international network, professional networks). They are often diffused through many and difficult identifiable actors”. However, the important factor is not the actors, but the ideas and the logic behind them. Table 4.4 provides an explanation for the different trajectories identified in the service context.

<table>
<thead>
<tr>
<th>No</th>
<th>Trajectories</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Technological</td>
<td>New logics for using technology that generally influence service products and production processes (e.g., the ICT wave, especially the Internet).</td>
</tr>
<tr>
<td>2</td>
<td>Service Professional</td>
<td>Methods, general knowledge, and behavioral rules (e.g., ethics) that exist within the different service professions (e.g., lawyers, nurses, catering).</td>
</tr>
<tr>
<td>3</td>
<td>Managerial</td>
<td>General management ideas or ideas for new organizational forms (e.g., motivational systems, Business Process Reengineering (BPR), and Service Management).</td>
</tr>
<tr>
<td>4</td>
<td>Institutional</td>
<td>The general trend of the evolution of regulations and political institutions (e.g., the European construction and the European research programs).</td>
</tr>
<tr>
<td>5</td>
<td>Social</td>
<td>The evolution of general social rules and conventions (e.g., ecological and environmental consciousness).</td>
</tr>
</tbody>
</table>

Source: Compiled from Sundbo and Gallouj (1998; 2000).

Four points here should be mentioned. First, empirical research in the financial service context shows that both service professional and technological trajectories are the most important external forces. Second, regarding the technological trajectory, some large financial institutions have contributed more to the ICT development than manufacturing. In fact, some large banks (with a history of leadership in defining their technology needs) orchestrate their manufacturing supplier, and play major roles in activities like standard-setting. Third, these five trajectories are not independent of each other; “they may in many situations be intertwined”. Fourth, although these trajectories are external forces, the innovation activities of a single firm can contribute to the “reinforcement” of a given trajectory (Barras, 1990; Miles, 2007; Sundbo and Gallouj, 1998: 8–9). Having critically
reviewed past research on organizational and market led innovation, I will turn now to critically reviewing the success/performance measurement.

4.2 The Performance of Radical Service Innovation

It is argued that innovation success is not just elusive, it is also multifaceted and difficult to measure, and there may be several stakeholders to consider, each may have different assessment (Brown and Eisenhardt, 1995; Griffin and Page, 1996). In the following, I will briefly review several theories of resource-based performance (competition) introduced within the strategic management and (service) marketing literature. Following this is a critical review for how past conceptual and empirical innovation research has sought to conceptualize and operationalize innovation success/performance.

4.2.1 Dynamic Theories of Sustainable Competitive Advantage

It is argued that RI, if successful, creates the competitive advantage (CA) of the future (Abernathy and Utterback, 1988; Chandy and Tellis, 1998; Hunt and Morgan, 1995; Salomo, et al., 2007; Sorescu, et al., 2003; Story, et al., 2011; Veryzer, 1998). Thus, no claim could be made regarding the key success/performance measurement of RI unless a theory of CA is adopted. Here, two points need to be made explicit. First, as the current research adopts the CBV of competition, the theory of competition adopted needs to be developed within the paradigm of competence-based view. This is believed to insure conceptual consistency. Second, theories of competition may be classified into: static theories; and dynamic (process or evolutionary) theories. In the dynamic theories, time is used as the main organizing device. As the current research adopts the processual worldview and employ a longitudinal research design, this theory of competition must be a process (dynamic rather than static) theory that reflects the radical innovator performance as the competition process resulting from the introduction of RI unfolds. This is believed to insure the methodological consistency. Third, several strategic and marketing scholars call for adopting process (rather than static) theories when investigating the competitive advantage resulting from the accumulation of superior resources (e.g., Hunt, 1997b; Hunt and Morgan, 1995, 1996; Kraaijenbrink, et al., 2010; Priem and Butler, 2001a).
Several dynamic theories of competition have been theoretically developed in the literature of strategic management and marketing. Of particular importance are: the competence-based competitive advantage (Reed and DeFillippi, 1990); the theory of competitive advantage in services industries (Bharadwaj, et al., 1993); and the resource-advantage theory, also known as the general theory of competition (e.g., Hunt, 1997b, 2000a, 2001; Hunt and Morgan, 1995, 1996). These theories suggest that assessing the competition process resulting from accumulating a superior capability (e.g., acceleration capability) should take into consideration three causally linked variables: temporary competitive advantage (TCA), also known as competitive positional advantage; sustainability of competitive advantage (SCA); and long-term financial performance. Thus, the radical innovator should establish first a TCA by, for example, satisfying unmet needs (as in the case of RI in the narrow sense), or improving the known performance features of 5-10x or greater (as in the case of radical innovation in the wide sense). Then, this TCA should be sustained for the radical innovator to be able to generate superior long-term financial performance. In other words, the TCA established explains the SCA, which explains the superior long-term financial performance. In this respect, the TCA-SCA relationship is argued to be moderated by a set of imitation barriers. Figure 4.2 depicts the dynamic nature of the success/performance suggested to measure the RI outcome.

Figure 4.2: The Success/Performance Measurement of RI

TCA (or positional competitive advantage) is said to have two components. The first component is the relative sum of all customer perceived benefits (values) of the market offering (superior, parity, or lower). Perceived value refers to “the sum total of all benefits
that consumers perceive they will receive if they accept a particular firm’s market offering.” It is these perceptions of value that drive marketplace behavior, consumer preferences and choices, and, thus, is “central to understanding how the process of competition actually works”. This “gross value” is a measure of the price the customer would have been willing to pay to obtain the desired benefits. The difference between the maximum willingness to pay and the actual price is known as “consumer surplus”. Form the point view of the customer, the difference between the relative gross value and the relative gross cost is known as the “relative net values” (Barney, 2007; Hunt, 2000a: 32-33; Lovelock and Wirtz, 2007: 131; Peteraf and Barney, 2003). The second component is the relative cost of producing and delivering this market offering (lower, parity, or higher). Dichotomizing the two components (relative value and relative cost) produces three types of marketplace position. Of particular importance is the TCA, which has three levels: (1) effectiveness-efficiency advantage, superior value with lower cost; (2) effectiveness advantage, superior value with parity cost; and (3) efficiency advantage, parity value with lower cost. In other words, the first case implies differentiation-cost advantage; the second case implies differentiation advantage; and the third case implies cost advantage (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999).

The TCA established by the firm will be sustained only if it lasts a longer time, or if it continues to exist after efforts to duplicate that advantage have ceased, hence the essential role played by imitation barriers in moderating the TCA-SCA relationship. These theories of competition also suggest that firms that are able to sustain the established CA will be able to generate superior long-term financial performance. In this respect, superior performance is defined as the level of performance exceeding some referent, e.g., the firm's own performance in a previous time-period or that of a set of rival firms (Barney, 1991; Bharadwaj, et al., 1993; Hunt, 1997b, 2001; Hunt and Morgan, 1995, 1996, 1997). Having briefly overviewed the dynamic theories of competition developed within the competence-based view of the firm, I will turn now to critically reviewing past empirical and conceptual research sought to assess the success/performance of innovation.
4.2.2 Knowledge Gaps in Measuring Innovation Success

A critical review for how innovation success/performance has been conceptualized and operationalized in past research is essential for two main reasons: to identify the gap in this layer of the conceptual framework; and to identify the contribution that could be brought to enhance the conceptualization of the dynamic theories discussed above. Table 4.4 presents a review of past empirical and conceptual research sought to assess the success/performance of innovation.
## Table 4.4: Past Conceptual and Empirical Research in Innovation Performance

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal/Study purpose</th>
<th>Approach/Unit of analysis/Sample</th>
<th>Success/Performance Variable(s) and Measures</th>
</tr>
</thead>
</table>
| Zirger and Maidique (1990) | *Management Science*  
- To examine the factors, differentiating the successful from unsuccessful development process concerning incremental technological innovation in the industrial context; and  
- To develop a model for new product outcome. | Triangulation, but mainly variance (cross-sectional) research.  
Product pair (one success and one failure).  
Four year study, involving three phases (undertaken in the USA): exploratory survey (158 new electronics products); a case study validation (21 cases); and large scale survey for hypotheses testing (172 new electronics products). | - The degree of a product's success/failure (a ten-point scale ranging from a major financial loss to a major profitability contributor, with financial breakeven at its midpoint (success or failure)). |
| Cooper, et al. (1994) | *Journal of Product Innovation Management*  
- To investigate the factors that separate very successful new service products (major successes) from the ordinary (modest successes) in the financial service sector (e.g., banks, insurance firms, trust companies). | - Variance (cross-sectional) research.  
- New service product project.  
- 173 new financial (retail and business) services. | - Three performance variables:  
- Financial performance (e.g., the profitability, market share, and growth of new product sales exceeded objectives, and total sales in terms of units/revenues is very high);  
- Relationship enhancement (e.g., the new products and its performance has improved the loyalty of existing customers, the new products and its performance has had a positive impact on the company's perceived image, the introduction of the product has enhanced the profitability of other products, and the new product has given the firm an important platform from which to introduce further new products); and  
- Market development (e.g., the product helped open up a new market to the company, the new product attracted significant new customers to the company). |
- To review and organize several streams of innovation research; and  
- To synthesis these streams by suggesting an integrative model of product development antecedents and outcomes. | Conceptual article. | - Innovation performance is suggested to be assessed by using three variables:  
- Process performance (leadtime/speed and productivity);  
- Product concept effectiveness (fit with market needs and fit with firm competences); and  
- Financial performance (profit, revenues, market share).  
- Process performance and the product concept effectiveness are suggested to explain the financial performance.  
- Successful products provided superior customer value through enhanced technical performance, low cost, reliability, quality, or uniqueness. |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Journal</th>
<th>Methods</th>
<th>Findings and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Griffin and Page, (1996)</td>
<td><em>Journal of Product Innovation Management</em></td>
<td>-Variance (cross-sectional) research.</td>
<td>The most appropriate measures of project-level and program-level success depend on the firm's project strategy and business strategy, respectively. For example, as both radical and incremental innovation projects have different objectives, processes, and competitive implications, both should be assessed differently. For all project strategies, innovation performance should cover three multi-item scales (shown below). Though, the order of the scales and the measures within each scale should differ with the project strategy. For RI projects, the scales and measures are: - Customer-based success (customer acceptance and customer satisfaction); - Technical or process-based success (competitive advantage); and - Financial success (meeting profit goals, and IRR or NPV). - For prospector strategy, the measures that are found to be most useful are: % profits from new products; % sales from the new products; and products lead to future opportunities (growth). Prospectors, being pioneers, will more frequently seek to develop more innovative products, even at the expense of short-term profitability.</td>
</tr>
<tr>
<td>McGrath and Ming-Hone, (1996)</td>
<td><em>Management Science</em></td>
<td>-Variance (cross-sectional) research.</td>
<td>Innovation performance is measured by three variables: - Expectation of distinctive value (e.g., the firm can meet new customer needs, the firm can serve entirely new customer segments, customers will get more value than in the past, customer will get more value than from competitors, quality will be better than competitors, and customer will pay a premium price); - Expectation of distinctive efficiency (cost will be reduced, and greater efficiency than competitors will be achieved); and - Expectation of rent (e.g., higher profits than competitors, revenue increases relative to competitors, customer achieve savings). Moreover, the first two variables (value and efficiency) are found to explain the rent.</td>
</tr>
<tr>
<td>Chandy and Tellis, (1998)</td>
<td><em>Journal of Marketing Research</em></td>
<td>-Variance (cross-sectional) research.</td>
<td>The propensity to introduce radical product innovation (e.g. number of radical product innovations introduced in the last 3 years, percent of total sales from radical innovations introduced in the last three years).</td>
</tr>
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</table>
### Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Source</th>
<th>Title</th>
<th>Description</th>
<th>Methodology</th>
<th>Performance Variables</th>
</tr>
</thead>
</table>
| Kusunoki et al. (1998) | *Organization Science* | To propose different types of organizational capabilities and different types of new product performance; To explore the effects of these organizational capabilities on the different types of product performance; and To identify the core capability, holding a crucial relationship with performance. | Variance (cross-sectional) research. | Product development performance is measured using three variables:  
- Productivity (e.g., development cost, lead time, and easiness to transfer to the production stage);  
- Product quality (e.g., product cost, and improvement in product functionality/quality); and  
- Innovativeness (e.g., major innovation in product technologies, and creation of new product concept). |
| Li and Calantone (1998) | *Journal of Marketing* | To assess the impact of market knowledge competence and R&D strength on new product advantage and market performance. | Variance (cross-sectional) research. | New product advantage (e.g., relative newness, productivity, uniqueness, reliability, compatibility, ease of use); and Market performance (perceptual measures such as relative profitability and return on investment, and objective measures such as actual market share and profit margin). Moreover, the new product advantage is found to explain the market performance. |
| Verona (1999) | *Academy of Management Review* | To update the extant NPD and NSD literature by extending the RBV and capability perspective to the innovation strategy. Suggesting product development performance drivers from the point view of the RBV. | Conceptual article. | Product development performance is suggested to be measured using two variables:  
- Process efficiency (lead time and productivity); and  
- Product effectiveness (fit with market needs and product quality). |
| Lievens and Moenaert (2000) | *Journal of Service Research* | To examine the antecedents and consequences of project communication during the new financial service innovation process. | Variance (cross-sectional) research. | Project success (the performance of the financial service innovation) is assessed by using three performance measures:  
- Financial performance (the project achieved the initial commercial objectives and expectations, the new service exceeded the market share and sales growth objectives, overall profitability of this new service was high);  
- Technological performance (the technological success/failure of the project); and  
- Achievement of learning effects (e.g., the development of this new financial service created a general development expertise that eased the development and introduction of subsequent new services). |
## Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Source</th>
<th>Journal/Study</th>
<th>Methodology</th>
<th>Sample Description</th>
<th>Key Findings</th>
</tr>
</thead>
</table>
| de Brentani (2001) | *Journal of Product Innovation Management*  
- To examine the influence of innovativeness on the factors that impact success and failure in the development of new business-to-business services.  
- Variance (cross-sectional) research.  
- New service development project  
- 276 innovation projects (150 projects were successes and 126 projects were failed), undertaken by 115 Canadian firms. | -Project performance variable (a number of specific measures such as sales/revenues, profitability, market expansion, in addition to an overall/global measure, which is the perceived overall degree of project success/failure). |
| Souitaris (2002) | *R&D Management*  
- To investigate the importance and awareness of firm-specific competences as determinants of technological innovation in the context of a European newly industrialized country.  
- Variance (cross-sectional) research.  
- Firm level.  
- 105 Greek industrial firms. | |
| Sorescu, et al. (2003) | *Journal of Marketing*  
- To examine the sources and financial consequences of radical innovations.  
- Longitudinal (time-series) study.  
- Breakthrough innovation project.  
- 255 breakthroughs introduced (during 1991-2000) by 66 publicly traded firms operating in the pharmaceutical industry. | -The financial value of radical innovation (the NPV of the future cash flow expected from the innovation). |
- To examine the impact of knowledge-based resources (applicable to the discovery and exploitation of opportunities) and entrepreneurial orientation (EO) on the performance of SMEs.  
- Longitudinal (two subsequent surveys) study.  
- The firm level.  
- 384 SMEs. | -Firm performance construct (a multi-item scale capturing 10 measures: sales growth, revenue growth, growth in the number of employees, net profit margin, product/service innovation, process innovation, adoption of new technology, product/service quality, product/service). |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Journal Title</th>
<th>Research Design</th>
<th>Sample Size/Details</th>
<th>Findings/Methodology</th>
</tr>
</thead>
</table>
| Blazevic and Lievens (2004)      | Journal of Service Research          | Variance (cross-sectional) | -65 successful and unsuccessful projects undertaken by 36 banks operating in the Belgian banking industry (37 commercially successful projects and 28 commercially unsuccessful projects). | -The performance of the new financial service is assessed by using financial and non-financial multi-item scales:  
-Cross-selling (this new service boosted sales or market share of the existing services, new customers, acquired through this new service, became user of existing services, and this new service enhanced sales and profitability of other services offered by our organization);  
-Corporate reputation (the introduction of this new service has strengthened the company’s reputation, and this new service had a positive impact on the reputation of our company);  
-Increasing service delivery capacity (e.g., this innovation is a platform that will ease introduction of subsequent new products, and the development of this new financial service improved the new service development capability of our organization);  
-Competitive position (e.g., this new service had unique benefits that made it superior to competitors); and  
-Cost position (e.g., through the introduction of this new service important cost efficiencies were achieved for the company). |
| Ritter and Gemünden (2004)       | Journal of Business Research         | Variance (cross-sectional) | -308 German industrial companies.                                                  | Innovation success construct, which have two sub-constructs:  
-Product innovation success (e.g., our products are of state-of-the-art technology); and  
-Process innovation success (e.g., our production facilities are of state-of-the-art technology).                                                                                                                                                                                                                                           |
| Herrmann et al. (2006)           | European Journal of Innovation Management | Variance (cross-sectional) | -87 SBU of 53 companies working in six industries (software, hardware, telecommunications, biotechnology, microelectronics and image processing) located in three countries (Germany, UK, and France). | -The propensity to produce radical innovations (a latent construct, manifested by five items, e.g., we launch radical innovations very often compared to our competitors).                                                                                                                                                                                        |
| Pavlou and Saway (2006)          | Information Systems Research         | Variance (cross-sectional) | -180 NPD Managers.                                                                 | -Competitive advantage in NPD, which include four dimensions:  
-Product effectiveness (e.g., improved quality, and high innovativeness);  
-Process efficiency (e.g., accelerated time to market and low overall development cost);  
-Perceived CA in NPD (gain CA, and gain strategic advantages in the marketplace); and  
-Accounting ratios (e.g., ROA, and sales growth).                                                                                                                                                                                                                                    |
## Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Study</th>
<th>Journal</th>
<th>Methodology</th>
<th>Sample Size</th>
<th>Performance Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooper and Kleinschmit (2007)</td>
<td>Research Technology Management -Benchmarking the business' new product development practice. -To explore the factors that drive new product performance at the business unit level (the critical success factors in product development).</td>
<td>-Variance (cross-sectional) research. -The business unit level. -161 industrial business units working in Germany, Denmark, US, and Canada.</td>
<td>-Nine performance dimensions: -Success rate (the proportion of development projects that became commercial successes); -% of sales by new products; -Profitability relative to spending; -Technical/technological success rating; -Sales impact; -Profit impact; -Meeting sales objectives; -Meeting profit objectives; and -Overall success.</td>
<td></td>
</tr>
<tr>
<td>Salomo et al. (2007)</td>
<td>Journal of Product Innovation Management -To examine the performance effects of different planning and process management activities in NPD projects.</td>
<td>-Variance (cross-sectional) research. -The project level. -132 NPD projects.</td>
<td>-The project performance is assessed along three perceptual dimensions: -Product success (meeting technical performance, product quality, and manufacturability objectives); -Market success (meeting sales, market share, and CA objectives); and -Project efficiency (meeting planned budget, timetable, and time to market objectives).</td>
<td></td>
</tr>
<tr>
<td>Dibrell et al. (2008)</td>
<td>Journal of Small Business Management -To investigate the mediating effects of information technology (IT) on the relationships among product and process innovations and firm performance (measured in multiple profitability and growth rate metrics).</td>
<td>-Variance (cross-sectional) research. -The firm level. -397 US SMEs.</td>
<td>-Innovation performance variable, capturing firms’ relative profitability and growth compared with peer competitors (e.g., primary business unit’s return on assets, return on sales, sales growth, and market share growth).</td>
<td></td>
</tr>
<tr>
<td>Menor and Roth (2008)</td>
<td>Production &amp; Operations Management -To examine the multidimensional nature of NSD competence; and -To test the relationship between NSD competence and performance.</td>
<td>-Variance (cross-sectional) research. -NSD program. -166 retail banks.</td>
<td>-NSD performance is measured using two variables: -NSD competitiveness (e.g., speed to market, meeting customer requirements, overall performance relative to competitors); and -NSD effectiveness (e.g., meeting corporate profit objectives for new offerings, ROI, and profitability relative to competitors); Moreover, NSD competitiveness is found to explain NSD effectiveness.</td>
<td></td>
</tr>
<tr>
<td>Moreno and Casillas (2008)</td>
<td>Entrepreneurship: Theory &amp; Practice -To examine the EO-growth relationship through the mediating role of three variables (strategy, expansion based on new products and technology, and expansion based on attention to need and market) and the moderating role of two variables (idle resources, and environment).</td>
<td>-Variance (cross-sectional) research. -The firm. -434 Spanish SMEs operating in several sectors (agriculture, industry, building, and services).</td>
<td>-Entrepreneurial growth (two indicators, one subjective sought to measure the rate of growth during the past 4 years compared to competitors, and one objective sought to measure the rate of growth in sales during the past 4 years).</td>
<td></td>
</tr>
</tbody>
</table>
### Chapter 4 Key Drivers of Radical Service Innovation Success

<table>
<thead>
<tr>
<th>Study</th>
<th>Journal</th>
<th>Methods</th>
<th>Context</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damanpour et al. (2009)</td>
<td><em>Journal of Management Studies</em></td>
<td>- Quantitative (longitudinal) research, with secondary data. - The firm level. - 428 public service organizations in the UK.</td>
<td>To examine the combinative effects of adopting several innovation types (e.g., service innovation, technological process innovation, administrative process innovation) on organizational performance over time.</td>
<td>Organizational performance (a multi-item scale covering six aspects: quantity of outputs; quality of outputs; efficiency; formal effectiveness; equity; and consumer satisfaction).</td>
</tr>
<tr>
<td>Salunkhe et al. (2011)</td>
<td><em>Industrial Marketing Management</em></td>
<td>- Qualitative (multiple-case) study (single key informant). - The firm level. - 13 project-oriented (business-to-business) firms located in Major Austrian capital city.</td>
<td>To draw on the dynamic capability-based view to develop a theoretical model capturing key antecedent factors driving the service innovation-based competitive advantage in the project-oriented service firms.</td>
<td>Sustained competitive advantage construct (no operationalization provided for this theoretical construct. Though, several previous studies are suggested to help in the operationalization).</td>
</tr>
</tbody>
</table>

Source: Self.
As shown in Table 4.4, 25 conceptual and empirical studies are reviewed. This table also shows that many and diverse constructs (and their measures) have been used to assess the success/failure of innovation. Several gaps and deficiencies are identified in this regard. First, some studies (e.g., de Brentani, 2001; Dibrell, et al., 2008; Salunke, et al., 2011) have assessed success using only one dimension, despite the fact that success is multifaceted. Second, quantitative research sought to assess the innovation success represents 88 percent (22 out of 25) of the studies, while qualitative research sought to address success represents only 4 percent (1 out of 25) of the studies. This suggests that there is a greater shortage of intensive research that would shed light on many aspects of innovation success. Third, some studies (e.g., de Brentani, 2001; 1998; Souitaris, 2002; Verona, 1999) have not considered the relative success. However, comparisons with competitors reveal important information (e.g., Li and Calantone, 1998; Wiklund and Shepherd, 2003). Fourth, Menor et al. (2002: 136-137) state that “the extant conceptual and empirical work in NSD . . . emanates primarily from service marketing and to a much lesser extent from [operations management] OM. However, much of that work—especially the empirical—lacks theory”. I identify this as one main deficiency featuring past research in innovation success. That is the majority of studies reviewed have sought to develop constructs (or measures) that assess the competitive position of the new product/service without adapting or even consulting relevant theories of competition. Thus, rather than operationalizing and replicating these theories of competition, innovation scholars have tended to develop new measures for the success/performance of the innovation activity. However, as argued by Griffin and Page (1996) and Gatignon, et al. (2002), the proliferation of these concepts and measures has caused confusion, and impeded the theoretical and empirical advance of the success assessment. Moreover, the product/service development community needs to bring some order to the variety and disorder of measures in both practice and academic success/failure research.

Fifth, there are only two studies (Blazevic and Lievens, 2004; Lievens and Moenaert, 2000) that consider the learning effect when measuring innovation success. However, it is argued that innovation in general is a knowledge creating activity (e.g., Madhavan and Grover, 1998; Nonaka, 2007; Popadiuk and Choo, 2006), and radical innovation in particular is a major source of creating original knowledge and generating step-functional learning about technologies and/or markets (e.g., O’Connor and DeMartino, 2006; Salomo, et al., 2007; Veryzer, 1998). Sixth, due to the scarce nature of radical
innovation practices and studies, very little research has sought to assess the success of radical innovations in innovation research in general, and radical service innovation research in particular. Chandy and Tellis (1998) state that the issue of analyzing the performance of radical innovation in terms of profits and market share warrants further study (future research). Sorescu (2003: 82), state that “virtually nothing is known about their [“radical innovations”] performance and financial value”. Herrmann, et al. (2006) state that considerable research is required if further light is to be shed on the RI determinant-performance relationship. Seventh, when addressing success, imitation barriers are either ignored by innovation research that does not adopt any resource-based view of competition, or assumed to exist by innovation research that adopts the RBV. This, however, represents a significant deficiency of past research and needs to be addressed in details, as shown below.

As argued by theories of competition discussed previously, imitation barriers represent isolating mechanism that brings important information to the analysis of success as they are suggested to moderate the CA-SCA relationship (Bharadwaj, et al., 1993; Hunt, 2000a). Moreover, Nelson and Winter (1977) argue that any useful theory of innovation should take imitation into consideration. In this respect, several imitation barriers have been suggested. Of particular importance is the ability of radical innovator to incrementally improve the radical innovation. For example, Zander and Kogut (1995) argue that imitation rates are influenced by the ability of the innovator to improve the product. Story, et al. (2011) argue that incremental innovation following radical innovation is essential as it seeks to improve the key performance attributes, which make the innovation more attractive to mainstream customers. Drew (1995) also argue that having the ability to quickly introduce incremental innovations is essential to retain customers by responding to their fast moving requirements. Abernathy and Utterback (1988) and Garcia and Calantone (2002) argue that radical innovator have to be nimble in responding to these changing customer needs before competitors. They argue that although innovations introduced by imitators have low levels of technological and market innovativeness these imitative innovations should not be underrated and radical innovators should move quickly and keep moving. Otherwise, early imitators can play a major role in remaking or creatively destroying the market. Moreover, Lovelock and Wirtz (2007) argue that true incremental innovators are able to diversify, differentiate, and introduce new dimensions into the positioning equation that competitors cannot immediately match. This has a very important implication especially that service
innovation research (Morris and Westbrook, 1996; Salunke, et al., 2011) has shown that the imitation behavior dominates service industries in general and the financial service industry in particular.

Having the ability to introduce incremental innovations is also well recognized in the organizational learning literature. For example, March (1991: 71) argues that both radical and incremental innovations (exploration and exploitation) are essential for organizational survival and prosperity. Organizations that engage in radical innovation to the exclusion of incremental innovation are likely to find that they “suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence” as the exploration of new alternatives “reduces the speed with which skills at existing ones are improved”. Subsequent empirical research (e.g., Atuahene-Gima, 2005; He and Wong, 2004) has found that being able to be ambidextrous has a positive impact on firm performance.

Surprisingly, the majority of innovation research that adopts a resource-based view of competition when analyzing success (e.g., McGrath and Ming-Hone, 1996; Menor and Roth, 2008; Pavlou and Savy, 2006; Verona, 1999; Wiklund and Shepherd, 2003) elaborates on the RBV rather than the CBV. The RBV argues that the determinants (resources or capabilities) of SCA should be unique and rare. Thus, these studies ignore the analysis of imitation barriers, which moderate the CA-SCA relationship, by theoretically arguing that a specific determinant is unique and rare. In other words, the theoretical argumentation that a resource is unique and rare replaces the empirical investigation of the moderating role of imitation barriers. In fact, research that scientifically critiques the theoretical framework of RBV and empirically assesses the level of it empirical support (e.g., Armstrong and Shimizu, 2007; Hoopes et al., 2003) find that the unique and rare attribute is conceptually invalid and redundant, which indicates the need for theoretical modification or refinement of the RBV. In the next section, I will provide a list of 13 criticisms of the RBV, dominating the literature.

All in all, seven gaps and deficiencies are identified regarding the way by which (radical) innovation success is assessed. In this respect, it is believed that the theoretical adaptation and qualitative empirical investigation will overcome these gaps and deficiencies. It should be noted, however, that both (the competitive advantage theories and innovation research reviewed) will mutually inform each other. On the one hand,
these dynamic theories of competition contribute to the literature in that it brings a logical and process grouping to the measurement of innovation success. That is, the radical innovating entity, which builds a superior capability (e.g., transition and acceleration), is eligible to generate CA if this capability produces superior value and/or lower cost than competitors. Moreover, these theories recognize that the established CA is temporary, and the ability of first-mover to sustain it is based on the existence of a set of imitation barriers. On the other hand, previous innovation research will be very useful when operationalizing the variables of these dynamic theories of competition.

4.3 The RVB: Thirteen Criticisms

The critical literature review has shown that many entrepreneurship and innovation studies elaborate on the RBV rather than the CBV although the latter view is more relevant to the proactive form of entrepreneurship. I also find that there is misinterpretation to: (1) the assumptions underlying both the RBV and CBV; and (2) the theoretical contributions brought by notable scholars, like Schumpeter (1934, 1942), Penrose (1959), Dierickx and Cool (1989a), to the field of strategic management, innovation, and entrepreneurship. For example, Lumpkin and Dess (1996) suggest incorporating the RBV into the conceptualization of the entrepreneurial orientation (EO) construct. However, I have argued throughout this chapter that the RBV is relevant when investigating the acquisitive form of entrepreneurship, while the CBV is more relevant when investigating the proactive form of entrepreneurship. Moreover, Alvarez and Busenitz (2001: 772) consider the RBV and CBV as one school of thought, and “distinctions are artificial”. However, I have argued throughout this chapter that both are counter schools of thought. In table 4.5, we will structure them into two counter views. This classification contributes to the management research in three ways: (1) to help the reader witness the deviation among the two views; (2) to call to attention the misrepresentation of some influential works in this line of research; and (3) to help researchers work through the wide terminological confusion and situate their work within the relevant view. In table 4.6, we will identify 13 criticisms for the RBV to help future scholars in recognizing its deficiencies, and refine its theoretical framework.
Chapter 4 Key Drivers of Radical Service Innovation Success

Table 4.5: The Main Differences between the RBV and CBV

<table>
<thead>
<tr>
<th>Terminologies</th>
<th>The RBV (The Acquisitive Form of Entrepreneurship)</th>
<th>The CBV (The Proactive Form of Entrepreneurship)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resources vs. productive services (Penrose, 1959); discrete resources vs. systematic resources; elementary (simple) resources vs. higher-level (complex) resources, goods vs. intermediate goods (Makadok, 2001); traits vs. configurations (Black and Boal, 1994); ordinary (undifferentiated) resources vs. embedded (firm-specific) resources (Dierickx and Cool, 1989a); basic, operand resources vs. interconnected, operant resources (Madhavaram and Hunt, 2008).</td>
<td>Strategic resources are characterized by being: (1) valuable; (2) rare; (3) inimitable; and (4) organization, also known as the VRIO (Barney, 1991; Barney and Clark, 2007). Any strategic resource could be acquired from the strategic factor market (Barney, 1986).</td>
</tr>
</tbody>
</table>

| Strategic Resources | Strategic resources are characterized by being: (1) nontradable (any strategic resource is accumulated internally); (2) nonimitable; and (3) nonsubstitutable. (Dierickx and Cool, 1989a). | Strategic resources are characterized by being: (1) valuable; (2) rare; (3) inimitable; and (4) organization, also known as the VRIO (Barney, 1991; Barney and Clark, 2007). Any strategic resource could be acquired from the strategic factor market (Barney, 1986). |

| Epistemology       | Positivist (Seoudi, 2009; Spender, 1994). | Constructionist (Spender, 1994). |

| Environment        | The environment is perceived as concrete, that events and processes are hard, measurable, and determinant (Daft and Weick, 1984). It is, therefore, objective, independent, accurately measured by managers (Seoudi, 2009). | The environment is perceived as subjective, difficult to penetrate, or changing, and, thus, less analyzable. It is, therefore, enacted, created by managerial cognition and action (Daft and Weick, 1984; Penrose, 1959; Seoudi, 2009). |

| Degree of strategic choice | Minimal (Seoudi, 2009): the organization to some extent may create the external environment. The key is to construct, coerce, or enact a reasonable interpretation that makes previous action sensible and suggests some next steps. The interpretation may shape the environment more than the environment shapes the interpretation. The organization is described as enacting organization (Daft and Weick, 1984). | Maximal (Seoudi, 2009): the organization to some extent may create the external environment. The key is to construct, coerce, or enact a reasonable interpretation that makes previous action sensible and suggests some next steps. The interpretation may shape the environment more than the environment shapes the interpretation. The organization is described as enacting organization (Daft and Weick, 1984). |

| Role of managers    | Managers are rational; they optimize (Seoudi, 2009). They are stock-pickers trying to beat the market. They gather information and analysis to outsmart the resource market in picking (selecting) resources, similar to the way that a mutual fund manager tries to outsmart the stock market in picking stocks (Makadok, 2001). They are “empire builders” or “financial speculators” (Penrose, 1959). | Managers are entrepreneurs; they synthesize and create (1959; Seoudi, 2009). They are architects. They design and construct organizational systems to enhance the productivity of whatever resources the firm acquires. They make their contribution largely through architecting and constructing capabilities internally (Makadok, 2001), “product-minded” or “workmanship-minded” entrepreneurs. (Penrose, 1959). |


| Theories           | Industrial Organization Economics (Sanchez, 2008; Seoudi, 2009). The Ricardian Perspective: this implies that heterogeneity in performance is due to ownership of resources that have differential productivity. Thus, the logical question is: “How do firms come into possession of resources with heterogeneous productivity in the first place? (Makadok, 2001). | Schumpeter’s Entrepreneurial Theory; The Theory of the Growth of the Firm (Seoudi, 2009; Spender, 1994, 1996); and The General (or Process) Theory of Competition (Hunt, 1999, 2000a, 2001; Hunt and Morgan, 1995, 1996; Madhavaram and Hunt, 2008). |


Source: Table 4.1 elaborates on and extends the original structure proposed by Makadok (2001) Seoudi (2009: 115-116).
Despite the fact that both views are counter, and the CBV is more relevant than the RBV, and also has got more empirical support than the RBV, the majority of scholars conceives them as complementary, and has been mainly elaborating on the RBV, while incorporating some elements of the CBV. In this respect, several scholars (e.g., Armstrong and Shimizu, 2007; Kraaijenbrink, et al., 2010; Newbert, 2007; Priem and Butler, 2001a; Spender, 1996) have thought to critically evaluate the relevance of the RBV of the firm for strategic management research, in general, and dynamic phenomena (e.g., change, innovation, and knowledge creation), in particular. We made an attempt to pull these criticisms together, and also to extend them. The outcome of this attempt was identifying 13 criticisms directed against the RBV, as shown in table 4.6.
The Accumulation Process of Intangible Resources (A Black Box)

It does not explicitly deal with the complex processes by which firms can endogenously accumulate and maintain all strategically valuable resources, namely that of intangible resources, the real source of CA. In other words, it is a “resource-picking theory”, rather than resource accumulating one.

Supporting Literature

Seoudi (2009); Sanchez (2008); Makadok (2001); Priem and Butler (2001a); Black and Boal (1994); Dierickx and Cool (1989a).
<table>
<thead>
<tr>
<th></th>
<th>The synergetic effect of a bundle of resources (A black box)</th>
<th>Sanchez (2008); Priem and Butler (2001a); Spender (1994, 1996); Black and Boal (1994).</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>It treats resources as <em>singular distinct items</em> rather than a <em>bundle of resources</em> that gives a <em>synergistic</em> result.</td>
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<tr>
<td></td>
<td></td>
<td>Sanchez (2008); Priem and Butler (2001a).</td>
</tr>
<tr>
<td>11</td>
<td>Unimplementable in practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unable to develop meaningful management tools in the form of actionable prescriptions for practitioners. Thus, it lacks the “operational validity” (less useful for practitioners).</td>
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</tr>
<tr>
<td>12</td>
<td>The epistemological impossibility problem</td>
<td>Sanchez (2008); Priem and Butler (2001a, 2001b).</td>
</tr>
<tr>
<td></td>
<td>The core proposition of the VRIO framework does not allow for <em>reproducibility of experiments, falsifiability, and generalizability</em>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Therefore, it is impossible to use the scientific method to test the RBV’s core proposition and thereby to generate new knowledge or understanding about the role of resources in firms’ competitive outcomes.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>One framework for several competitive contexts</td>
<td>Sanchez (2008); Priem and Butler (2001a).</td>
</tr>
<tr>
<td></td>
<td>Little effort to establish appropriate contexts for the VRIO framework has been apparent.</td>
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</tbody>
</table>

*Source: Self.*
4.4 Summary

I have sought to critically review past research on the key drivers of radical innovation success in the service context. Regarding the drivers and success assessment, I have started by reviewing several theories and mentioned to future research directions called for by notable scholars in the fields of entrepreneurship, innovation, strategic management, and marketing. By comparing the theories and future research directions with past conceptual and empirical research, I have been able to identify fifteen gaps and deficiencies. Of particular importance is the lack of: (1) Core Radical Innovation Competence (Core RIC) construct that captures the set of complementary capabilities and strategic resources that have long-term nature and need to be accumulated before the initiation of radical innovations; (2) entrepreneurial (resource building) capability construct that is essential to accumulate the Core RIC; (3) project management capability constructs that are required to manage radical service innovation projects; (4) variables that assess the sustainable competitive advantage (success) that result from successful radical (service) innovations; and (5) an integrative conceptual framework that identifies the interrelationships among the constructs and that also links them to the variables of sustainable competitive advantage. Moreover, I have also critically reviewed past research on the market led innovation to be able to identify how and when the contribution of these external entities should be taken into consideration when developing the integrative conceptual framework.

Furthermore, I have found that the resource-based view (RBV) dominates the fields of strategic management, entrepreneurship, and innovation although it is only relevant for one type of entrepreneurship (the acquisitive from), while the competence-based view (CBV) is the least utilized although it is more relevant to the proactive from of entrepreneurship. Furthermore, I have found that there is a lack of qualitative longitudinal research, which is the most relevant research design when empirically examining dynamic phenomena. In short, by developing a multi-layer (dynamic) conceptual framework for the key capabilities and competences of radical innovation success and by qualitatively and longitudinally examining this framework in the service context, I will be able to open the black box of this phenomenon.
In Chapter 5, I will make a theoretical attempt to develop an integrative conceptual framework. I will explore in-depth the dimensions of Core RIC, entrepreneurial (resource building) capability, the capabilities of radical innovation project management, and the operationalization of the variables assessing the sustainable competitive advantage (success). Moreover, I will suggest the propositions linking these constructs and variables. Thus, the theoretical contribution will be made explicit in this chapter.
Chapter 5 The Development of an Analytical Conceptual Framework

The main aim of this chapter is to propose an analytical conceptual framework for the key capabilities and competences of radical innovation success in the financial services context. The chapter is organized in seven main sections. In section one, I will discuss in-depth the dimensions of Core RIC construct. In section two, I will discuss the dimensions of entrepreneurial (resource building) capability construct. In section three, I will discuss in-depth the dimensions of project management capability constructs. In section four, I will discuss the constructs that assess sustainable competitive advantage (innovation performance). In section five, I will suggest the propositions that identify the interrelationships among the capability constructs, and that also link these constructs to the sustainable competitive advantage. In section six, the theoretical contribution will be made explicit. In section seven, I will provide a summary for the chapter.

5.1 Core RIC Dimensions

As discussed in the theory section in Chapter 4, one major principle of the competence-based view (CBV) of the firm is that a core competence is a superordinate theoretical construct that is manifested by a set of lower-order dimensions that are complementary (interconnectedness of asset stocks). Another major principle is that any asset stock cannot be adjusted instantaneously due to the time compression diseconomies (Dierickx and Cool, 1989a; Madhavaram and Hunt, 2008). In this section, I will explore in depth the dimensions of this superordinate theoretical construct. A review of the literature suggests five capabilities underlying the Core RIC. These are: (1) R&D capability; (2) IT capability; (3) cooperative (networking) capability; (4) managerial systems; and (5) innovation-friendly culture. In the following sub-sections, I will discuss in depth these 5 capabilities. Moreover, I will conclude this section by discussing the complementary among the five constructs.

5.1.1 R&D Capability

There is a wide body of literature stressing the value of research and development (R&D) activities as a key determinant of firm’s innovative performance (Lengnick-Hall, 1992; e.g., Mowery and Rosenberg, 1979; O’Connor and Ayers, 2005; Vega-
In this respect, several scholars have investigated the R&D activity in service industries, and find empirical evidence that service firms do undertake R&D activities, despite the lack of familiarity with the concept of R&D in the service context. Thus, the idea that services conduct no R&D is “clearly mistaken” or unrecognized, and services’ share of business R&D is growing rapidly, especially in developing countries (Amable and Palombarini, 1998; Barras, 1986, 1990; Djellal, et al., 2003; Djellal and Gallouj, 2005; Drew, 1995; Miles, 2007). By examining the nature of R&D in the service context, I find that the R&D capability needs be captured by several dimensions. These are: (1) Proactive Research; (2) Team Capability; (3) Contributors; and (4) Potential Absorptive Capacity. The following is a discussion for each dimension underlying the R&D capability.

### 5.1.1.1 Proactive Research Capability

Recent studies on service innovation have shown that service firms conduct both basic and applied research. Both types of research seek to acquire new knowledge of the underlying foundations of phenomena and observable facts. While the former is undertaken without any particular application or use in view, the latter is directed primarily towards a specific aim or objective. These studies also show that research in social sciences and humanities (SSH) seems to occupy an important place in services. Examples are: economic R&D; consumer, market, and opinion R&D; management and organization R&D; actuarial and demographic R&D; and R&D in law. In fact, research in these areas (non-technological R&D) has given rise to many innovations in services: new modes of service provision and new services, as well as new types of relations (new ways of organizing relations) with other partners, such as suppliers. These studies, thus, show that service innovations have become more organized and push determined through R&D, with special emphasis on research on SSH rather than natural and technical sciences (Amable and Palombarini, 1998; Djellal, et al., 2003; Miles, 2007). The finding of these recent studies, thus, extend the previous view that service firms, as argued by Sundbo (1997), innovate on the basis of quick ideas, not from scientific results.

Moreover, research in radical industrial innovation shows that exploratory marketing research is an essential, yet emerging, feature of the R&D capability. For example, O’Connor and Ayers (2005) and O’Connor and DeMartino (2006: 488) find that the
R&D capability of radical innovator is equipped with “exploratory marketing group”. The role of this strategic growth group, which is created within the central R&D department, is to learn about (problems in) markets and industries the firm is unfamiliar with, and to develop proposals for potential big opportunities and new businesses in those domains based on their R&D’s technical richness (know-how). This is more akin to what Veryzer (1998) calls solutions searching for problems. In short, the previous findings suggest that the ability to undertake proactive research and studies intended to increase the stock of knowledge about technology (not only related to technologies in the narrow sense, but also technologies specific to services, e.g., legal, financial, actuarial, etc.) and market is a critical dimension underlying the R&D capability of the innovating service firm.

5.1.1.2 Teams Capability

The literature of industrial and service innovation suggests that development team capability is one essential dimension of the R&D capability of the innovating firm. However, there is a debate about the type (structure) of the development team. In this respect, three types of development teams are identified: ad hoc cross-functional development teams (with a trivial role assigned to the R&D/innovation departments); generalist development teams (within a dedicated R&D/innovation department); or communities-of-practice.

The majority of innovation research argues that the ad hoc cross-functional team is the main form of innovation organization. For example, Sethi et al. (2001) state that firms are increasingly entrusting product development to cross-functional teams, which consist of members from several functional areas such as marketing, engineering, manufacturing, and purchasing. Amable and Palombarini (1998) state that R&D activities in the service context have informal nature as they are carried out in several functions where R&D is not the main activity. Gallouj (2002: 118-119) stated that cross-functional teams “are favored and tend to proliferate with varying degrees of success”. Sundbo (1997) examines the nature of innovation activities in the financial services industry, and finds that innovation is developed in ad hoc organizations, not in permanent R&D department. Djellal and Gallouj (2001) examine the nature of innovation activity in several service industries, and find the majority of the innovating firms in their sample identify R&D/innovation departments are unimportant as the main
form of organizing the development activity is formal structures (cross-functional teams). Djellal, et al. (2003: 426) conduct 30 case studies of service firms carrying out R&D, and find that several actors, from different departments (e.g., marketing, legal affairs, actuarial), are engaged in research, design, and development activities. As such, the R&D “population” involves not only engineers, but also legal experts, economists, sociologists, psychologists, management experts, architects, and so on. Thus, R&D is carried out in numerous places where it is not the main activity, and full-time researchers are few in number. Miles (2007) finds that few services organize R&D in the classic mode, having R&D managers and departments. Thus, he confirms the findings that service firms do conduct R&D-like activities performed by ad hoc groups, rather than permanent departments. Cooper and Kleinschmidt (2007) find that the quality of cross-functional teams assigned to the development activity is a key to innovation success.

Contrarily to the previous, other studies highlight the essential role played by other two team structures, especially in the early phases of radical innovation development. These are: generalist development teams; and communities-of-practice. For example, McDermott and O’Connor (2002: 435) and O’Connor and Ayers (2005: 30) find that the existence of dedicated development teams is essential for the success of radical innovation projects. This type of formal team structure plays critical roles in the early phases of the development project. These team members, through job rotation, are able to accumulate deep and wide experience and build webs of formal and informal relationships with individuals, both inside and outside the firm. They call this type of developers “generalists” development teams, a dedicated group of people responsible for making radical innovation happen. In this respect, representative from other functions and areas can be appointed as part-time consultants to the team when needed. They state that this goes against the innovation literature, which argue that cross-functional team capability is essential. However, they argue that cross-functional teams are wrong for radical innovation project, especially in its early phases which would require a core group of multifunctional individuals. In short, while these studies argue that “there must be a dedicated group of people responsible for making radical innovation happen”, they do not deny the important role played by cross-functional teams in the late phases of radical innovation development.
While the previous research finds that the generalist development team structure complement the cross-functional team structure, other scholars argue that it is the informal, collective thinking and practices, communities-of-practices, which have a profound impact on the performance of radical innovation projects (Coombs and Hull, 1998; Dougherty, 1995; Leifer, *et al.*, 2001; McDermott and O’Connor, 2002; Miles, 2007; Nonaka, 1994; von Hippel, 2005). Wenger and Snyder (2000: 139) argue that this collective practice is a new organizational form “that promises to complement existing structures and radically galvanize knowledge sharing, learning, and change. . . . They are [“self-organizing”] groups of people informally bound together by shared expertise and passion for a joint enterprise”. Djellal and Gallouj (2001) find that 31.2% of the innovating firms in their sample identify informal networks of executives and professionals as a main source of innovation or ideas for innovation. O’Connor and DeMartino (2006) find that breakthrough ideas come not only from the scientist’s bench, but also from groups of creative people within the organization. In short, the innovation literature suggests that while cross-functional teams are necessary, they are not sufficient when radical innovation is considered. There are other team structures that are found to complement the cross-functional team structure, and are responsible for the early phases of radical innovation development.

### 5.1.1.3 A Network of Contributors

Despite the debate regarding the type and structure of development teams, service innovation research recognizes that many functions and organizational levels can contribute to the innovation recognition, particularly by providing ideas for innovation. Drew (1995) and Sundbo (1997) find that ideas for innovations come from all parts and levels of the organization. Djellal and Gallouj (2001) find that 66.7% of the innovating firms in their sample identify sales force, front office employees, and other contact personnel as a main source for ideas for innovation. They find that these individuals play critical role in identifying the expressed needs, or detecting needs waiting to be discovered. Akamavi (2005) stresses that NSD requires the inputs of players (contributors) from many different (technical and administrative) functions in the organization. Finally, Ordanini and Parasuraman (2011: 14) find that the participation of contact personnel represents “robust driver of service innovation”, and has a positive effect on radicalness.
5.1.1.4 Potential Absorptive Capacity

Previous research has found that outside sources of knowledge are critical to firms seeking to accumulate R&D capability. For example, Cohen and Levinthal (1990: 128) argue that the ability to exploit external knowledge is a critical component of the innovation capability. They call this ability “absorptive capacity”, “the ability of a firm to recognize the value of new, external information [“knowledge”], assimilate it, and apply it to commercial ends”. Subsequent research has sought to clarify this concept by: (1) identifying its contents and linking these contents to incremental vs. radical innovation; and (2) stressing its path-dependent nature. Both are discussed below.

Van den Bosch et al. (1999: 552) contribute to this concept by theoretically suggesting that the content and process of a firm’s knowledge absorption can be analyzed using three dimensions: (1) efficiency, referring to “how firms identify, assimilate, and exploit knowledge from a cost and economies of scale perspective”; (2) scope, referring to “the breadth of component knowledge a firm draws upon”; and (3) flexibility, referring to “the extent to which a firm can access additional, and reconfiguring existing, component knowledge”. They also suggest that high efficiency is important for exploitation initiatives (incremental innovations), and wider scope and high flexibility are important for exploration initiatives (radical innovations). In a similar vein, Whitley (2000: 868) links absorptive capacity to different types of innovation strategies, including incremental and radical innovation strategies. He also argues that radical innovation requires a high degree of scope and flexibility. Regarding the scope, he describes the knowledge base deriving radical innovations as high in “organizational complexity”, due to the fact that different (highly varied) kinds of scientific and technological fields providing information for the development activity. Regarding the flexibility, he describes the knowledge base deriving radical innovation as quite dynamic, due to the extremely high degree and changing nature of technical and market uncertainties.

The previous discussion shows that a wider scope and greater flexibility characterizes radical innovation development. While this conception of absorptive capacity is consistent with the literature of RI development, it is, in fact, static in nature, and does not recognize the dynamic (path-dependent) nature of this ability, and misses the original contribution delivered by Cohen and Levinthal (1990). They argue that this
capacity has a path dependent nature in that accumulating absorptive capacity in one period will permit its more efficient accumulation in the next. In a similar vein, Davies and Brady (2000) investigate the organizational learning cycle, leading to the introduction of new lines of business, and find that absorptive capacity is at the core of this cycle, and the development of this capacity has path-dependent, cumulative nature. Zahra and George (2002) provide more clarification for the concept of absorptive capacity, which I find consistent with the asset mass efficiencies and time compression diseconomies (discussed in the theory section in Chapter 4). They decompose absorptive capacity into two components: potential absorptive capacity; and realized absorptive capacity. The former represents a knowledge base that should be acquired first, while the latter refers to the ability to tap into this initial level of knowledge to generate an advantage through innovation and new product development. In short, the potential component is critical for the firm to be able to accumulate the realized component, and both components should not be collapsed in one concept as the former is causally linked to the latter. Lane et al. (2006: 858) review past conceptual and empirical research, and find that “scholars have used that construct in a highly reified manner”. They suggest that absorptive capacity is accumulated through “sequential processes”, starting by the potential component of absorptive capacity, which, in fact, has exploratory nature. They also state that “there has been little attempt at understanding the relationship between current [potential] absorptive capacity and radical innovation”. In short, part of the absorptive capacity should be accumulated before the initiation of radical innovation, in which another part will be accumulated.

The important question becomes: How the potential component of absorptive capacity could be accumulated? Cohen and Levinthal (1990) argue that the initial level of absorptive capacity can be accumulated in two main ways: by investing in relevant basic research in an attempt to broaden the knowledge base of the firm regarding specific fields (as mentioned in proactive research capability); and by adopting innovations along the same trajectory to ease learning in the subsequent period. The suggestion that the potential component of absorptive capacity may be accumulated through innovation adoption has found empirical support. Considering service innovation, Barras (1990) and Windrum and García-Goñi (2008) provide empirical evidence that radical innovators produce a set of incremental innovations first to be able to accumulate learning that facilitates introducing radical innovation in the subsequent period. The work of Rothaermel and Alexandre (2009) provides more clarification for
the type of incremental innovation that may be pursued to accumulate potential absorptive capacity. They find that there are two types of incremental innovations: internal exploitation; and external exploitation. The former represents incremental innovations that are completely based on the experience base of the firm and does not seek to incorporate any external knowledge, and thus have a zero level of absorptive capacity, and do not serve future radical innovations. The latter represents incremental innovations in which firms seek to accumulate an initial level of absorptive capacity that would serve future radical innovations. Story et al. (2011) suggest that incumbent innovators, seeking to accumulate only incremental innovation competence, are more concerned with the first type while incumbent innovators, seeking to accumulate both incremental and radical innovation competences, are concerned with both types.

In short, past research that acknowledges the path-dependent (dynamic) nature of absorptive capacity and organizational learning suggests that this ability has two components (potential and realized), and that the potential component needs to be accumulated before the initiation of RI. Moreover, the introduction of incremental innovations that would serve future radical innovation projects is a major way in accumulating the potential component.

All in all, the previous discussion of past conceptual and empirical research shows that R&D capability of the service firms needs to be captured by several dimensions: (1) proactive research capability, especially basic research and research in social sciences and humanities which occupies an important place in services; (2) team capability, generalist development teams or communities-of-practice (being responsible for the early phases of radical innovation development) and cross-functional teams (being responsible for the late phases of radical innovation development); (3) contributors; and (4) the accumulation of potential absorptive capacity (through the introduction of incremental innovations). Despite the multidimensional nature of R&D capability, there is a lack of R&D capability construct, utilizing the body of knowledge accumulated along several research streams. Lane et al. (2006: 859) argue that this problem is common in most areas of organizational research, and has led to “a scattered pattern of knowledge accumulation, in which studies are statistically significant but theoretically fragmented”.
5.1.2 IT Capability

Information technology (IT) may be defined as the “hardware, software, telecommunications, and the services of IT personnel, whether employed in-house or purchased” (Oz, 2005: 790). The adoption of new IT represents a main driver for innovation in the service context. Moreover, through its proactive adoption of new IT (considerable use of new technologies, e.g., e-mail, networks, groupware, expert systems, neural nets, virtual reality), the financial services industry is described as one vanguard sector, leading the service revolution (Barras, 1986, 1990; Drew, 1995; Morris and Westbrook, 1996). Several scholars argue that firms with high levels of technological utilization will have greater innovation effectiveness (Dibrell, et al., 2008; Froehle et al., 2000; Madhavaram and Hunt, 2008; Nambisan, 2002; Nambisan et al., 1999; Prahalad and Ramaswamy, 2000; Verona, 1999).

Tippins and Soh (2003: 748) elaborate on the RBV and define IT capability as “the extent to which a firm is knowledgeable about and effectively utilizes IT to manage information within the firm”. They conceptualize this capability as a second-order construct consisting of three first-order latent factors: IT objects (computer-based hardware, software, and support personnel); IT knowledge (possessing a body of technical knowledge about objects such as computer based systems); and IT operations (utilizing IT to manage market and customer information). Using a structural equation modeling and survey data from 271 industrial firms, they show that the three hypothesized first-order factors are statistically significant in defining IT capability. They also find that the IT capability is indirectly related to firm performance. Ritter and Gemünden (2004: 550) define technological competence as “ability to understand, use, and exploit relevant state-of-the-art technology internally”. They conceptualize this capability as a second-order construct consisting of two first-order latent factors: technological collaboration reasons; and technological expertise. Using a structural equation modeling and survey data from 308 industrial firms, they show that the two hypothesized first-order factors are statistically significant in defining IT capability. They also find that the IT capability is directly related to innovation performance. In the financial services context, Menor and Roth (2008) elaborate on the RBV and conceptualize IT experience as first-order construct. They find that this construct is essential component of NSD competence, which is directly related to performance.
All in all, previous research on the IT capability construct has shown mixed results. Some scholars conceptualize this construct as second-order construct manifested by a set of lower-order latent dimensions, while others conceptualize it as a first-order latent construct. Moreover, some scholars find that this construct is directly related to performance, while others highlight the role of intervening variables. In this respect, Tippins and Soh (2003) suggest that the direct/indirect conflict of the impact of IT capability on performance may return to that some studies neglect the complex nature of IT capability construct by conceptualizing it as unidimensional construct. I will adopt the construct developed by Tippins and Soh (2003). That is the IT capability will be conceptualized as a theoretical construct manifested by: (1) IT objects; (2) IT knowledge or expertise; and (3) IT operations. It should be noted, however, that none of the previous studies has sought to qualitatively investigate the multidimensional nature of this capability in the banking sector. As argued by many methodologists (e.g., Robson, 2011; Saunders, et al., 2009; Yin, 2009), in-depth, qualitative investigation would provide thick description that could facilitate the identification of the several facets (dimensions) of this construct relevant to the research context. Moreover, conducting longitudinal research could resolve the doubt regarding the existence of intervening variables, due to its ability to open the black box.

5.1.3 Cooperative (Networking) Capability

In Chapter 4, I have critically reviewed partner and supplier led innovation. The discussion shows that, in the networking economy, a radical (service) innovator is embedded in an innovation network of cooperating partners (e.g., de Vries, 2006; Stanko and Calantone, 2011; Story, et al., 2011; Windrum and García-Goñi, 2008). As such, any conceptual framework concerning the drivers of radical innovation success needs to take into consideration the interfirm networking.

Interfirm networking has been conceptualized differently in past research. For example, Pennings and Harianto (1992) find that networking (measured in networking events) has a positive impact on the organizational propensity to adopt major technological innovation in the financial service industry. Herrmann, et al. (2006) find that forming clusters of suppliers and customers has a positive impact on the organizational propensity to innovate radically in the industrial context. They conceptualize these clusters as first-order latent variable. In their cross-sectional study of the semiconductor
industry, Sivadas and Dwyer (2000) find that cooperative capability has a positive impact on alliance NPD success. This capability, however, is conceptualized as a theoretical construct manifested by three first-order latent factors: (1) high level of trust; (2) effective communications between partners; and (3) effective coordination. Finally, in their cross-sectional study of a sample of mechanical and electrical engineering firms, Ritter and Gemünden (2004) find that network capability has a significant positive impact on innovation success. They conceptualize this capability as a theoretical construct manifested by two latent dimensions: network management task execution; and network management qualifications.

I will adopt the cooperative capability construct developed by Sivadas and Dwyer (2000) as it is believed that their dimensions possess the three attributes of asset stock accumulation. First, it possesses the attribute of time compression diseconomies. The three dimensions underlying this construct (trust, effective communications, and effective coordination) are believed to require considerable time because they are built through learning and experience. Second, it possesses the attribute of asset mass efficiencies. Pennings and Harianto (1992) find that firms that lack a high level of strategic relationships with germane partners and suppliers (measured in terms of the cumulative number of partnership events) is less likely to innovate radically. Most importantly, Story, et al. (2011: 962) find that “radical innovations are often developed in a complex, dynamic and uncertain environment. As a result, actors cannot build trust and commitment incrementally over time. Instead, some actors rely upon existing relationships. Others draw upon relationships that were historically important but have been dormant for some time, where the connections between actors are made because of having worked with each other in the past. Yet, others intentionally cultivate relationships with organizations that they believe will be strategically important in the future”. Third, it possesses the attribute of interconnectedness of asset stocks (complementarity will be discussed in section 5.1.6).

All in all, the cooperative (networking) capability is found to significantly predict the firm’s propensity to innovate radically. Moreover, past research also shows that there is a need to conceptualize this capability as a theoretical construct. In this respect, I will adopt the construct of cooperative capability developed by Sivadas and Dwyer (2000). That is the cooperative capability will be conceptualized as a theoretical construct manifested by: (1) trust; (2) effective communications; and (3) effective coordination. It
should be noted, however, that this construct is developed and empirically validated in the context of industrial innovation, and none of the previous studies has sought to qualitatively investigate the multidimensional nature of this capability in the banking sector. Moreover, it is expected that examining the history of relationships established with germane partners and suppliers (including governmental bodies) through a longitudinal qualitative research will produce rich conceptualization for the dimensions of this construct. In this respect, Sivadas and Dwyer (2000: 33) state that “we do not claim that these three variables [dimensions] exhaust the domain of this cooperative capability . . .”. Moreover, they identify studying this phenomenon from a “dynamic, longitudinal perspective” as one future research direction.

5.1.4 Managerial Systems

Leonard-Barton (1992) identifies managerial systems as one constitute part of the core NPD competence. These systems encourage and sustain the innovative activities as they play essential roles in creating and controlling knowledge. Examples of these managerial systems are: tailored reward and incentive systems; apprenticeship programs, including classroom education and on-the-job training; and job rotation. Lengnick-Hall (1992: 410) argues that tailored (contingent) rewards and incentives that match risks are essential to foster “intrapreneurship”. Drew (1995) finds that linking rewards to innovation is an essential factor to accelerate the development of new products/services in the financial sector. In a similar vein, Souitaris (2002) finds that offering extensive incentives is essential to encourage employees in generating innovative ideas. On the other hand, Verona (1999) and Stringer (2000) argue that recruiting systems seeking to hire more creative and innovative people, who are at the cutting edge of their disciplines, is another important dimension of the managerial systems of innovative firm.

Apprenticeship programs and job rotation seem to be of particular importance. Nonaka (2007) argues that strategic rotation (especially between different areas of technology and between functions such as R&D, operations, marketing, and sales) is one main driver of knowledge creation and innovation. He argues that such rotation helps employees understand the business from a multiplicity of perspectives. Adler (1995) finds that job rotation and internship programs plays an essential role as they allow developers to accumulate experience in operations, and accumulate understanding of
producibility constraints. This way of accumulating knowledge about the operations environment is considered as one coordination mechanism that seeks to build the developers’ tacit knowledge about the operations environment, and is used to reduce as much as possible the need for other coordination mechanisms during the development phase, like mutual adjustment and joint teams. Grant (1996) and Kogut and Zander (1992) argue that this form of coordination by developing tacit knowledge, which is noncodifiable and complex, is the most efficient mechanism as it reduces the need for communication among different specialized work units which is required to integrate organizational knowledge. McDermott and O’Connor (2002) find that successful developers have rotated through a number of positions in several business units before joining the RI development teams to be able to accumulate deep and wide experience and build webs of formal and informal relationships with individuals, both inside and outside the firm.

All in all, past conceptual and empirical research has shown that managerial systems are important driver of knowledge creation and control, and innovation. It also has shown that several managerial systems should be considered. Despite this, the dimensions of the managerial systems construct have remained theoretically fragmented, and past research has remained descriptive in nature. Moreover, there is a lack of empirical research that explores this critical construct in the banking sector, and shows how its dimensions are operationalized in practice. In other words, there is a lack of theoretical managerial systems construct, capturing all the critical dimensions required to facilitate knowledge creation and control, and innovation in the banking sector context. Past research, however, suggests that managerial systems need to be conceptualized as a theoretical construct manifested by four lower-order latent dimensions. These are: (1) strategic job rotation; (2) effective training programs (e.g., apprenticeship programs); (3) tailored reward and incentive systems to entrepreneurs (entrepreneurial retention); and (4) and effective recruiting systems.

### 5.1.5 Innovation-friendly Culture

Corporate culture (values, norms, and attitudes) has been found to have an impact on the propensity of an organization to innovate. It is considered as a powerful means of stimulating creativity, knowledge sharing, and innovation (Harborne and Johne, 2003; Kanter, 2006; Lyons et al., 2007; Verona, 1999). However, previous research has
shown that the contents of corporate culture relevant for incremental innovation differ from the ones relevant for radical innovation. For example, Moorman (1995) differentiates between four types of organizational culture: clan; hierarchy, adhocracy, and market. He finds that a clan culture, being high in trust and mutual supportiveness and low in conflict and resistance to change, insures high level of shared understanding and knowledge sharing among organizational members, which is positively related to creativity and novelty. Sørensen (2002) suggests that the type of culture and the type of innovation and change is closely related. In the culture of exploitation, there will be a high level of commitment to: an established way of understanding the world; and the established competences. Individuals will subscribe to a dominant perspective and show a high level of uniformity. Thus, this type of culture enhances incremental innovation as it minimizes the heterogeneity in assumptions, beliefs, and behaviours. This type of culture, however, will be ill-suited to exploration (radical innovation and change) for two reasons. First, organizational members may have greater difficulty in recognizing the need for radical change and innovation, and may have a tendency toward suppressing creative solutions. Second, exploration is fostered though the existence of viable countercultures. This insures the variety in assumptions and beliefs, and allows deviant behaviours. In short, the culture of exploitation insures homogeneity and enhances the performance of incremental innovation, while the culture of exploration insures heterogeneity and enhances the performance of radical innovation.

Moreover, de Brentani (2001) find that a corporate culture that encourages entrepreneurship and creativity is a factor specific to new-to-the-world services rather than incremental innovation. Furthermore, Sethi (2001) finds that encouragement to take risk (a culture that promote risk-taking) leads to a greater degree of product innovativeness. In a similar vein, Smith et al. (2005) find that a culture of risk-taking has a positive impact on the capability to create new knowledge. Harborne and Johne (2003) suggest that a strong value toward knowledge sharing is essential to create climate that promotes innovation. Furthermore, den Hertog, et al. (2010) argue that an open service innovation culture that values experimentation, prototyping, and thinking out of the box, is expected to be essential when managing service innovation in a sustained way.

While the previous studies show that a certain type of culture encourage radical innovation and change than others, other studies show that the corporate culture of most
established organizations is oriented toward incremental innovation, and thus is considered as major barrier for bringing big ideas to market. For example, Stringer (2000) argues that most large companies seek to preserve the status quo, and thus the culture of incremental innovation dominates. This culture, however, is conservative, and discourages and de-motivates entrepreneurs who are the drivers of radical innovations. Thus, he suggests making radical innovation a cultural priority as one main strategy to stimulate innovation in large companies. In a similar vein, McDermott and O'Connor (2002) and O'Connor and Ayers (2005) find that, in established firms, internal cultures often push efforts toward more low risk, immediate reward, incremental projects. They also find that, in nearly all the cases investigated, there is a need for culture change before RI could begin to happen. The exploitative culture seems also to dominate many service industries, especially the banking industry (Drew, 1995; Morris and Westbrook, 1996). In this respect, Lyons et al. (2007) argue that corporate culture is a critical yet less obvious source of influence of sustained innovation at the organizational level. They also state that past research has often focused on identifying the creative potential among individuals, but scholars have devoted less attention to understanding sustained innovation at the organizational level.

All in all, previous research has shown that there are several types of corporate culture and that a certain type of culture is open to change and provides an environment that fosters and sustains radical innovation. It also has shown that several values, norms, and attitudes should be considered. Despite this, the dimensions of this certain culture construct have remained theoretically fragmented. For example, while Moorman (1995) find that a clan culture is high in mutual supportiveness and low in resistance to change, Sethi (2001) and Smith et al. (2005) find that a culture that promotes risk-taking lead to a greater degree of innovativeness. Moreover, there is a lack of empirical qualitative reseach that explores this critical construct in the banking sector (which is largley dominated by the culture of incremental innovation), shows how its dimensions are operationalized in practice, and shows the mechanisms by which the strategic leaders shape the corporate culture to be less conservative, and to foster radical innovation and change. Past research, however, suggests that corporate culture needs to be conceptualized as a theoreticall construct manifested by four lower-order latent dimensions. These are: (1) mutual supportiveness; (2) low in resistance to change; (3) promoting risk taking; and (4) promoting knowledge sharing.
5.1.6 Complementarity among the Dimensions of Core RIC

The previous discussions have shown that there are five capabilities and strategic resources that are essential for the radical innovation strategy. These are: R&D capability; IT capability; cooperative capability; managerial systems; and innovation-friendly culture. Each capability is conceptualized as theoretical (multidimensional) construct, which is manifested by a set of lower-order dimensions. These five capabilities, however, may be conceptualized as distinct theoretical constructs, or as five dimensions underlying one superordinate theoretical construct. Here, the decision must be informed by the theory adopted (Law, et al., 1998). As discussed in the theory section, one major principle of the CBV is the interconnectedness of asset stocks. That is if accumulating increments in one capability depends on the level of another capability, which is its complements, the two capabilities need to be conceptualized as two dimensions underlying one superordinate theoretical construct (Madhavaram and Hunt, 2008). In this respect, the literature suggests that the five capabilities and strategic resources are complementary.

For example, there is complementarity between innovation-friendly culture and the other constructs. It is argued that a supportive corporate culture is not only a critical capability within the radical innovation competence, but also permeates the other innovation-related capabilities, and thus should be aligned with these capabilities. New values will not take root if the associated behaviours are not rewarded, and entrepreneurial retention is essential to promote the value of risk-taking (Chander et al., 2000; Lengnick-Hall, 1992; Leonard-Barton, 1992; Lyons, et al., 2007). Corporate culture also should promote external absorption of knowledge (Verona, 1999), and thus the accumulation of potential absorptive capacity. It should also promote establishing strategic relationships of suppliers and partners (Herrmann, et al., 2006). Moreover, the discussion of the R&D and managerial systems shows that both capabilities are complements. For example, strategic rotation, one dimension underlying the managerial system construct, is essential to accumulate the generalist development and cross-functional team capability, one dimension underlying the R&D capability construct (Adler, 1995; McDermott and O'Connor, 2002; Nonaka, 2007). Extensive incentives are essential to encourage employees (contributors) in generating innovative ideas (Souitaris, 2002). Furthermore, the R&D activities are also complemented by the IT related (tangible and intangible) assets. Thus, a failure to invest in IT can cause a firm to
be unable to support its R&D activities (Dibrell, et al., 2008). Moreover, the cooperative capability also complement the R&D and IT capabilities. Pennings and Harianto (1992) find that cumulative interfirm links do not only significantly predict the commercial banks’ ability to innovate, but also correlate with the accumulation of IT experience and absorptive capacity. Ritter and Gemünden (2004) theoretically argue that network competence complements technological competence. Vega-Jurado (2008) finds a high level of complementarity between technological (or internal R&D) capability and cooperation with external actors, and this high level of complementarity, in supplier-dominanted sectors, is very important for the development of new to the market products.

In short, as these five capabilities and strategic resources are complements, they need to be conceptualized as lower-order dimensions, underlying one superordinate theoretical construct, the Core RIC. However, as shown in the critical review section, very little research has conceptualized complementary capabilities and strategic resources as dimensions underling one superordinate theoretical construct. Two reasons may be identified. First, critics of the superordinate theoretical constructs argue that both the theoretical and empirical utilities of the superordinate theoretical construct models are inferior to multiple dimensions (multivariate structural models) that conceptualize these dimensions as a set (Edwards, 2001). (This will be discussed in details in Chapter 6.) Second, the majority of this research is grounded in the RBV, in which capabilities and competences are seen as distinct rather than a bundle. Having discussed the dimensions of Core RIC, and conceptualized it as a superordinate theoretical construct, manifested by five lower-order capabilities and strategic resources, each is manifested by first-order dimensions, I will turn now to discussing the role of strategic managers in building the Core RIC.

### 5.2 Entrepreneurial (Resource Building) Capability Dimensions

In Chapter 4, I have critically reviewed a large body of innovation, strategic management, entrepreneurship, and marketing research considering the role of strategic leaders in building organizational capabilities and strategic resources. I have found that the majority of past research has focused on the role of executive champions in creating (operational capabilities), deploying, and allocating resources during the RI project.
However, a distinction has been made between the core operational competence and the Core RIC, which is considered, as discussed in the theory section in Chapter 4, as a higher-order change capability. Moreover, there is a lack of qualitative longitudinal research that examines how these strategic leaders build the asset stocks underlying the Core RIC, which will drive the radical innovation project. However, a long line of research adopting the CBV asserts that corporate executives and senior managers are the causal actors who play the role of capability patrons, being responsible for building and protecting core competences and strategic resources.

For example, Penrose (1959) is the first to assert that it is the executive ambition to organic growth that is essential to create organizational resources that will enable the firm to grow and compete on innovation. Lado, et al. (1992) theoretically argue that firm competences are proactively created and nurtured through the pattern of strategic decisions and actions of the firm’s strategic leaders (entrepreneurs). They argue that these strategic leaders are responsible for: (1) gap filling, the identification of unmet customer needs by introducing unique product offering; (2) and input completion, the appearance and adjustment of unique and idiosyncratic (nontradeable) resources. As they attack the problem of change, they synthesize and create mainly transformation-based competences: (1) innovation competence that may lead to the Schumpeterian creative destruction, creating the competitive advantage of the future; and (2) culture, enhancing the organizational capacity for learning and adaptation, and knowledge creation. In a similar vein, Verona (1999) theoretically argue that senior managers are essential agents as they are responsible for building the innovation-related capabilities, including R&D capabilities, managerial systems, and supportive culture. Davies and Brady (2000) find that strategic managers are responsible for building the capabilities that lead to new business creation and the establishment of strategic advantage. Thus, they conclude that building strategic capabilities should follow a top-down approach. Makadok (2001: 387) argues that strategic managers are architects, who design and construct organizational systems to enhance the productivity of whatever resources the firm acquires. They make their contribution largely through architecting and constructing capabilities internally. Thus, they adopt the “capability-building mechanism”. Herrmann et al. (2006) find that a key driver for radical innovation is that top management must establish appropriate incentives for employees, especially developers, to adopt a life-long learning culture.
The previous studies highlight the essential role played by strategic leaders, as capability patrons, in building many capabilities underlying the Core RIC. Other studies also assert that capability patrons do not only build core competences, but also protect these competences. For example, Prahalad and Hamel (1990) and Hamel (1994: 32) assert that “protecting core competences from erosion takes continued vigilance on the part of top management”. In their six-year longitudinal case studies of 10 multinational corporations, Leifer, et al (2001) observe a system of patronage works in corporate innovation. In this system, several corporate executives are found to be responsible for building, nurturing, and protecting innovation-related capabilities.

Despite the essential role played by these entrepreneurial executives, there is lack of research that explores the dimensions of the entrepreneurial capability required to build the Core RIC. Thus the current research project differs from the cross-sectional studies of Moreno and Casillas (2008) and Salunke et al. (2011). While they find that entrepreneurial orientation (EO), captured by innovativeness, proactiveness, and risk taking, is essential to build prospector strategy and a set of dynamic capabilities that will drive radical innovations, neither they address the process by which these capabilities are built, nor the prospector strategy and dynamic capability variables are theorized to possess the three attributes of asset stock accumulation.

The process by which strategic resources and capabilities are built is an empirical question, and will be examined qualitatively and longitudinally by the current research project. However, the conceptualization of the Core RIC discussed in the previous section suggests that the dimensions of the entrepreneurial (resource building) capability needs to be captured by dimensions that differ from the conventional three attributes of EO (innovativeness, proactiveness, and risk taking) used in most entrepreneurship research. First, the argument that executives entrepreneurs should shape organizational culture to be open to change and drive radical innovation suggest that the attribute of shpaers of culture should be conceptualized as one dimension. Second, the argument that the entrepreneurial executives are responsible for building essential capabilities, like R&D capability, that will drive radical innovation projects suggests that entrepreneurial ambition to grow and compete through innovation suggests that ambition for organic growth should be conceptualized as another dimension. Third, the Core RIC is believed to be a very complex and dynamic resource, due to the complementarity attribute and the tacit nature of organizational capabilities.
Previous research has shown that a complex bundle of resources requires organizational engineers (architects), who are able to: construct individual capabilities; configure and bundle them; and seek ways to increase their causal understanding. This suggests that executives as engineers should be conceptualized as a third dimension of the entrepreneurial (resource building) capabilities (Black and Boal, 1994; King and Zeithaml, 2001; Lengnick-Hall, 1992; Makadok, 2001).

All in all, the previous discussion shows that corporate executives are responsible for building and constructing Core RIC, and that the team of entrepreneurial executives should possess several attributes to be able to engage in resource-based strategizing. Despite this, previous empirical research has focused on the role of executive champions in deploying and allocating resources during the RI projects. Moreover, past research stressed the role of corporate executives in building organizational capabilities has either remained descriptive, or conceptualized the dimensions of entrepreneurship in terms of the conventional attributes of proactiveness, innovativeness, and risk taking. However, the previous in-depth discussion has revealed different attributes that are more relevant when the Core RIC is considered. In this respect, previous research suggests that entrepreneurial capability needs to be conceptualized as a theoretically construct manifested by three lower-order latent factors: (1) executives as capability patrons (ambition to grow organically, build and protect the relevant innovation capabilities); (2) executives as shapers of cultures; and (3) executives as engineers.

5.3 Project Management Capability Dimensions

As shown in table 4.1, several qualitative studies have sought to examine how radical innovation projects in the industrial context are managed. These studies find that the tools and techniques used when managing incremental innovations are not conducive when managing radical innovation. Moreover, these studies have sought to develop descriptive models for radical innovation management. For example, Veryzer (1998) develops a model, which includes the following 7 phases: conversion (direction); formulation; preliminary design; evaluation preparation; formative prototype; testing and design modification; and prototype and commercialization. O'Connor and DeMartino (2006) develop a model, which include 3 phases, each require different capability. Their project management capability framework includes: discovery capability; incubation capability; and acceleration capability. Story et al. (2011)
examine the task- and network-roles required to effectively build 4 capabilities required to manage radical innovations. These are: discovery capability; incubation capability; acceleration capability; and commercialization capability. While these studies contribute significantly to our knowledge, they focus on industrial radical innovation. Moreover, these project management frameworks have remained descriptive. Thus, there is a lack of research sought to further develop the dimension of these capability frameworks, and examine them in the service context. In the following, I will elaborate on past relevant research to further develop the dimensions of the discovery-incubation-acceleration capability framework developed by O'Connor and DeMartino (2006).

5.3.1 Discovery (Direction) Capability Dimensions
The direction capability may be defined as the behaviour, exploratory, and conceptualization skills and activities required to create (or recognize), elaborate, articulate, and initially evaluate opportunities for RIs (O'Connor and DeMartino, 2006; Story, et al., 2011). The outcome of this phase is to take a decision to whether or not to launch the incubation phase (Salomo, et al., 2007). A review of the literature suggests four dimensions underlying the direction capability. These are: (1) establishing the entrepreneurial frame; (2) idea generation; (3) opportunity recognition; and (4) initial evaluation. In the following sub-sections, I will discuss in depth these 4 dimensions.

5.3.1.1 Establishing the Entrepreneurial Frame
This capability may be defined as the ability of the top management team (TMT), or the committee responsible for leading and managing the radical innovation project, to identify a clear strategic direction for the radical innovation project. Salomo, et al. (2007) find that the TMT should clearly identify the strategic goal of the project (e.g., which opportunity should be pursued, and which segment(s) should be targeted). They also find that, despite the fuzzy nature of the front-end phases, the stability of this goal is key to radical innovation success. Sundbo (1997) suggests that the clarity of these strategic goals is important to prevent the innovation activities from becoming uncontrolled. It should be noted, however, that while the entrepreneurial frame should be clear regarding the ends, it should not be clear regarding the means (the ways by which the strategic goal will be accomplished). Being flexible regarding the means is important for two reasons. First, Quinn (1985: 73) argues that radical innovations occur in a “probabilistic setting”. As such, like many successful small entrepreneurs,
established companies have to “accept the essential chaos of development”. Cheng and Van de Ven (1996: 593) find that chaos imply that the development process consists of “a nonlinear dynamical system, which is neither orderly and predictable, nor stochastic and random”. Second, Amabile (1998) and McGrath and MacMillan (2000) argue that such a probabilistic setting implies that the development team should explore the unknown and learn new skills. Thus, flexibility regarding the means is critical to: create a sense of urgency, challenge, and ownership; and stimulate creativity.

All in all, past conceptual and empirical research has shown that the TMT should identify clearly the strategic goal of the radical innovation project while giving the development team more freedom to explore the unknown and develop new skills. As stated by O’Connor and DeMartino (2006: 495), RI projects require both “discipline and creativity”, and both are essential in developing the discovery capability. Despite this, these two dimensions have remained theoretically fragmented. The current research project suggests establishing the entrepreneurial frame as the first step in the direction capability, and that this dimensions needs to be conceptualized as the theoretical construct manifested by two first-order factors: (1) the clarity of strategic goal identified by the TMT; and giving more freedom to the development team (flexibility of means).

5.3.1.2 Idea Generation Capability

This capability may be defined as the ability to generate an abundance of creative raw ideas for development opportunity (Leifer, et al., 2000; Veryzer, 1998). O’Connor and DeMartino (2006: 486) examine 10 multinational corporations, which have been introducing 12 radical innovation products, and observe that the “quantity and quality of potential radical innovation opportunities coming into their systems were insufficient”. In other words, raw ideas for “big hit projects” are found to be “sorely lacking” in these companies. As such, much of the early efforts are spent in educating company members about how to “think big”, and generating and screening ideas. Moreover, sending internal members searching outside the firm for breakthrough ideas (“idea hunters”) is identified as major source for idea generation. Veryzer (1998) also points out to the difficulty in generating breakthrough ideas. He, however, identifies the existence of a determined champion as a major source for generating breakthrough ideas. Reid and de Brentani (2004) suggest that entrepreneurial individuals and executives operating as boundary spanners, and who seek to identify, understand, and act on unstructured
problems and emerging environmental patterns, are essential driving forces in case of radical innovations. Story, et al. (2011) identify two major sources for idea generation: entrepreneurial individuals; and suppliers.

In short, past research has identified a set of mechanisms for generating breakthrough ideas. Moreover, Veryzer (1998) and O'Connor and DeMartino (2006) identify generating an abundance of big raw ideas as a critical step within the discovery (direction) phase. As such, the current research project will conceptualize the quality (creativity) and quantity (abundance) as two first-order factors underlying the idea generation capability. The creativity dimension is important to generate breakthrough idea revolutionizing the market. The abundance dimension is important to explore the several possibilities opened up by the new opportunity, and to increase the probability of pursuing a successful bundle.

5.3.1.3 Opportunity Recognition

This capability covers what Veryzer (1998: 315) calls the “formulation” and “preliminary design” phases. This capability may be defined as the ability to recognize the few raw ideas with real business potential and to develop these raw ideas into a comprehensive description of the full concept (Story, et al., 2011). Opportunity recognition and articulation are found to be essential steps due to the gap between the breakthrough idea and the potential business opportunity. Salomo, et al. (2007) argue that it is difficult to recognize the opportunity due to the existence of high level of uncertainties in different areas. Thus, they suggest that involving a diverse set of actors increases the richness of information and helps to secure early validation of concept. They also find that articulating a clear product concept statement is one essential activity in the pre-decision business planning. In a similar vein, Story, et al. (2011) find that understanding, elaborating, and articulating the potential opportunity is a challenging task for radical innovators and idea owners. Therefore, they argue that these idea owners should communicate with others to be able to understand, elaborate, and articulate the opportunity. In other words, they identify connecting and articulating as essential two roles required to accumulate the discovery capability.

Story, et al. (2011) find that, in many cases, suppliers and partners are involved to help in recognizing the opportunity. Leifer, et al. (2000: 27), O'Connor and Rice (2001), and
Rice et al. (2001) argue that, to effectively recognize the opportunity, there is a need for an effective opportunity recognizer, idea champion, who has both “technical and business savvy, and market sense to the business potential in a radical idea”. Most likely opportunity recognizers have a multifunctional knowledge and skills, especially in technology, marketing and business development; are in an organizational position that enable them to think broadly about, for example, technological and social trends, markets, and customers; and have a “political clout”, and informal networks that involve “out-of-the-box thinkers”. Having such knowledge and skills, opportunity recognizers are able to play two roles. First, they work their informal networks to create a chain of reaction regarding the raw ideas. This helps in validating assumptions, checking reality, and developing and elaborating the concept. (Please note that from the point view of the Characteristics-based Approach of innovation discussed in Chapter 3, a concept may be defined as a description of: (1) the market needs; (2) the components of the new core solution (Y*), or the substantially improved solution (Y); and (3) the structure [(C*)(C*)(T*)] mobilized to produce the core solution.) Second, they have the ability to articulate the opportunity in compelling terms that gain the attention of TMT. Being able to play these roles, opportunity recognizers serve as a critical link between the idea generation step and initial innovation evaluation process.

All in all, past research has shown that opportunity recognition is essential for accumulating the discovery (direction) capability. Past research also suggests that two latent first-order factors underlie the opportunity recognition. These are: (1) connecting, which is essential to create a chain of reaction to understand and elaborate the opportunity; and (2) articulating, which is essential to move the raw idea to a clearly articulated concept.

5.3.1.4 Initial Evaluation

This capability may be defined as the ability to prepare a strong case for continuing the project, and to effectively evaluate the project and make the “go/no-go decision (O’Connor and Rice, 2001; Salomo, et al., 2007: 287; Veryzer, 1998). Veryzer (1998: 315) argues that the team should prepare “a cursory market or business analaysis” that meet the formal project review requirments. This proposal should provide the TMT with an indication of the direction, technical advanatge, and commercial viability of the proposed product. Rice, et al. (2001) argue that this proposal should also mention to
whether the firm possess the technology development capability, and how the team would fill any gap in technology development (e.g., internal development vs. outsourcing). Rice, et al. (2001) suggest that the team should highlight that a prototype can be developed early/quickly to demonstrate the technology’s applicability. Moreover, Salomo, et al. (2007) also find that the team should address the risk associated with the development activities. As radical innovation projects often venture into unexplored technological arenas and/or target toward unknown markets, the team should conduct an initial risk analysis to show how the extremely high levels of technological and market uncertainties will be overcome.

While the previous discussion shows that preparing a strong business case is essential for successful evaluation, past research shows that as this stage is a part of the fuzzy front end phase, the TMT evaluation should be fuzzy and entrepreneurial. O'Connor and Ayers (2005) argue that the evaluation process should be entrepreneurial rather than managerial, one that have strong orientation to uncertainty, experimentation, and opportunism. O'Connor and Rice (2001: 108) argue that the use of conventional forms of evaluation (e.g., early market research on new characteristics, and detailed financial projections regarding the development expenses, production costs, and sales revenues) is inappropriate for radical innovation, and will most likely lead to premature rejection of promising concepts. Thus, rather than relying on the traditional evaluation process used when evaluating incremental innovations, the TMT or evaluating committee should rely on their “gut feelings that the project could have a significant impact on the long-term success of the firm, and their trust in the project champion”. Lynn et al. (1996) and Veryzer (1998) also find that the information gathered through the traditional market research techniques (e.g., customer surveys and concept testing) is misleading.

While the previous discussion shows that the evaluation process of radical innovation differs from the evaluation process of incremental innovation, past research also finds that the composition of the evaluation panel does matter. Rice, et al. (2001) find that radical innovation projects are not only associated with technological and/or market related issues, but also corporate strategic issues. They identify two important issues in this regard. The former is related to whether the new technology will make sense within the strategic framework of the organization (the appropriateness of the new direction for the firm). The latter is related to that several corporate executives may be reluctant to support the development of the new technology as the radical innovation would involve
cannibalization, or extend and stretch the firm’s core business in new directions. In this respect, Leifer, et al. (2000) suggest that an effective evaluation panel may include, for example, credible, visionary, risk-taking senior managers, and “savvy” business development managers.

In short, past research suggest that a realistic initial evaluation is an essential process within the discovery capability. Past research also suggests that the initial evaluation capability needs to be conceptualized as a theoretical concept manifested by two lower-order latent dimensions. These are: (1) preparing a strong business case; and (2) evaluating the radical innovation project in an effective way. The former is essential to strengthen the belief and confidence in the new opportunity, and encourages the entrepreneurial panel to use its gut instinct, and accepts the risk and uncertainty. All in all past research finds that the discovery (direction) capability is essential within the project management capability framework. Moreover, past research also suggests that several capabilities underlie the direction capability. Despite this, past research has remained mainly descriptive, and there is a lack of a direction construct.

5.3.2 Incubation Capability Dimensions

The incubation capability may be defined as the technical, market, and business model experimentation activities and skills required to mature and advance the articulated opportunity into a business proposal (O'Connor and DeMartino, 2006; Story, et al., 2011). The outcome of this phase, thus, is to develop a business proposal that enable the TMT in taking a decision whether or not to launch the acceleration phase. O'Connor and DeMartino (2006: 490) define a business proposal as “a working hypothesis about what the technology platform could enable in the market, what the market space will ultimately look like, and what the business model will be”. A review of the literature suggests three dimensions underlying the incubation capability. These are: (1) assigning a new venture champion; (2) developing an effective plan for reducing the technical and market uncertainties; and (3) building and finalizing the business model. In the following sub-sections, I will discuss in depth these 3 dimensions.

5.3.2.1 Assigning a New Venture Champion

Past research, that addresses the way by which radical innovation projects are managed, stresses the critical roles played by strong product and technical champions during the
development activity. However, the current research project distinguishes between the:
incubation (and network) champion driving the incubation capability (O'Connor and DeMartino, 2006; Story, et al., 2011); idea champion and opportunity recognizer driving the discovery capability (O'Connor and Rice, 2001; Rice, et al., 2001); and the push and pull champions driving the acceleration capability (O'Connor, et al., 2002), and increases the willingness to cannibalize (Chandy and Tellis, 1998; Herrmann, et al., 2006) and adopts the innovation (Ettlie et al., 1984; Morris and Westbrook, 1996). As stated by many innovation scholars (e.g., Damanpour and Wischnevsky, 2006; O'Connor and Ayers, 2005; O'Connor and DeMartino, 2006; Story, et al., 2011), radical innovations are developed through different phases, each required distinctive capability.

Many scholars have mentioned to the high degree of uncertainties specific to and the chaotic environment characterizing the incubation phase (e.g., McDermott and O'Connor, 2002; Salomo, et al., 2007). Moreover, many scholars have highlighted the role played by suppliers and partners in the development of the radical innovation (e.g., de Vries, 2006; Herrmann, et al., 2006). In this respect, past research suggest that champions play two major roles in this phase: champions as incubators; and champions as integrators. Champions as incubators should possess several attributes that enable them to effectively lead the incubation phase. Leifer, et al. (2000: 72) identify a set of critical attributes, e.g., superior technical know-how; deep understanding about the dynamics of the experimentation process; comfortable with uncertainty; sufficiently flexible to be able to handle course corrections as progress unfold; seeing the job as one of “learning and leading”, rather than “controlling and managing”; having access to a wide, informal network; and having incredible ability to sell their vision. They argue that champions possessing these attributes will be able to: select relevant team members (if cross-sectional team structure will be followed); set the team expectations regarding the multiple uncertainties they have to deal with; and educate the team members regarding how to deal with these uncertainties. Story, et al. (2011) highlight the role champions as integrators. Integrating refers to the existence of a network champion who coordinates and integrates among the actors involved in the network. The actor playing this role should have a particular set of attributes, e.g., familiarity with the emerging networks and actors, and an ability to integrate new actors that effectively perform their roles. Actors playing this role recognize the need for pragmatism in their choice of partners for generating these competences.
In short, past research suggests that new venture champions play essential roles in building the incubation capability (the second capability within the capability framework of radical innovation project management). Moreover, past research suggests that this needs to be conceptualized as a theoretical construct manifested by two lower-order latent factors. These are: (1) champion as an incubator; and (2) champion as integrator.

5.3.2.2 Rapid Prototyping and Accumulating Experimenting Learning

This capability may be defined as *the ability to develop a prototype early/quickly, and to go live to experiment, accumulate step-functional learning, and reduce the technical and market uncertainties* (Lynn, *et al.*, 1996; O’Connor, 1998; Veryzer, 1998). Past research suggests that this capability needs to be captured by two dimensions: rapid prototyping; and live experimenting. Veryzer (1998: 316) finds that the majority of radical innovators seek first to develop a “formative” “exploratory” prototype. This prototype helps in: determining the suitability of new technologies for particular product applications; and further developing ideas. He also finds that these prototypes are not elaborate, being built from existing systems and components to provide a platform for early applications of the new and unproved technology. He also finds that the prototype phase is followed by “testing and design modification” phases. In these phases, the development team seeks to test and modify the technology. Here, the focus is on evaluation and validation of the technical solutions. After re-evaluating the specifications, making the necessary adjustments, and reaching a stable design, the team goes live in a limited customer tests. The aim is not only to evaluate the technical characteristics of the product, but also test assumptions regarding specifications and customer needs. He also finds that during this live experimentation several non-technical issues are raised and explored. Here, the development team cycles through these two phases until being able to validate the technical solution, and satisfies new requirements and specifications emerged during the process.

Other industrial and service innovation studies find that (radical) innovators follow such a process of rapid prototyping and live experimenting (through pilot projects). In industrial innovation, Lynn, *et al.* (1996: 15) call this process going live to “probe-and-learn”, in which a crude prototype is developed, and subsequently tested (in several markets) and modified. von Hippel (1994: 434) calls this approach the “rapid
prototyping method” that has the ability to capture the “sticky information” related to
the customer latent needs. O'Connor (1998) identifies this mechanisms as the best one
to learn about markets for radical innovation. Leifer, et al. (2000: 82) find a similar
mechanism, and argue that “a prototype is a mechanism for teaching the market . . . and
for learning from the market”. In service innovation, Tax and Stuart (1997), Djellal, et al.
(2003: 424), and Thomke (2003) find that several service firms, including banks,
establish a “genuine life-size laboratory” (“prototype facility”) to experiment and test
technical and non-technical characteristics.

This process of prototyping and live experimental learning enables the development
team is resolving the majority of technical and market uncertainties. This process is
particularly relevant for radical service innovation. Lovelock and Wirtz (2007) argue
that if the new service offering is sufficiently “complex, multidimensional, or novel”, it
may be difficult, due to the “intangibility” and “mental impalpability” problems, for
prospects to understand what the experience of using them will be like and what
benefits will result. Alam (2002), Thomke (2003), and Carbonell et al. (2009) find that
technical and market uncertainties create inefficiencies in the design and development
process. Thus, customer’s observation and active involvement enable the team to
validate many of the technical and market assumptions as early as possible, avoids
making costly and time-consuming modifications in later stages of the innovation
process (e.g., introduction), and obtains an extensive learning enabling the team to
substantially improve the new product (including the addition of new final
characteristics), and producing another prototype

This approach is more akin to the “discovery-driven planning” suggested by McGrath
and MacMillan (1995: 44). In their approach, a list of critical assumptions is developed,
prioritized, and tested through accumulating experimental leaning. As the project
unfolds, newly appeared uncertainties are added and tested. In this respect, Salomo, et
al. (2007) suggest that the development team needs to list all the expected uncertainties
and hurdles, and attack them sequentially, not simultaneously. Rice, et al. (2001) argue
that the team should recognize that the set of hurdles and uncertainties identified are
initial, and some hurdles and uncertainties would only become apparent as the
technology development proceeds. Thus, the list of uncertainties should be updated
In short, past research has shown that the effective management of the process of prototyping and live experimental learning could enable the development team of the radical innovator to manage the fuzzy frond end of the radical innovation project, which has a chaotic nature. Past research also suggests that the process is best captured by two dimensions. These are: (1) rapid prototyping; and (2) accumulating (live) experimental learning.

### 5.3.2.3 Building and Finalizing the Business Model

This capability may be defined as the ability to explore potential partnership arrangements and business models for the ultimate venture. In this respect, the incubation phase is not complete until the business proposal includes one or more business models (O'Connor and DeMartino, 2006). Leifer, et al. (2000: 98-106) and McDermott and O'Connor (2002) state that, with the help of relevant actors (e.g., business development people), the project team should understand, experiment, and define the “entire value chain”; find a place in this chain that is profitable and has long-run promise; and recruit and develop partners who will excel at the rest of the value chain. The clarity and completeness of these recommendations is critical before obtaining the authorization from the TMT to finalize the business model, and to move the product to the acceleration phase. In other words, this step should provide clear and complete recommendations to the TMT regarding the impact of this innovation on the various stages involved in the production and delivery of this new product and how the radically new product will create value for the various stages involved: suppliers and partners, the radical innovator, and the ultimate customer. The business model (value-added chain), thus, considers the relevant infrastructure required to move the product to the market in a manner that is easy, convenient, and profitable for the various stages involved in the business model. In this respect, McIntyre (1988) and Afuah and Bahram (1995) argue that building such supportive infrastructure is critical in determining not only whether an innovation finally achieves widespread adoption or not, but also the speed with which adoption of an innovation takes place.

All in all past qualitative research finds that the incubation capability is an essential capability within the project management capability framework. Moreover, past research also suggests that several capabilities underlie the incubation capability construct. These are: assigning a new venture champion; rapid prototyping and
accumulating experimenting learning; and building and finalizing the business model. Despite this, past research has remained mainly descriptive, and there is a lack of an incubation capability construct.

5.3.3 Acceleration Capability Dimensions

The acceleration capability may be defined as the exploration and exploitation activities and skills required to ramp up the fledgling business to a point where it can stand on its own relative to other business platforms in the ultimate receiving unit (O'Connor and Ayers, 2005; O'Connor and DeMartino, 2006; Story, et al., 2011). A review of the literature suggests three dimensions underlying the acceleration capability. These are: (1) managing the transition to operations; (2) implementation; and (3) introduction. In the following sub-sections, I will discuss in depth these 3 dimensions.

5.3.3.1 Managing the Transition to Operations

Past research suggests that three factors are essential to be able to effective manage the transition process. These are: (1) assembling a transition team; (2) assigning (push and pull) transition champions; and (3) assessing the transition and integration readiness.

Assembling a Transition Team

This capability may be defined as the ability to create and prepare a team to be responsible for transiting the radical innovation to an existing SBU. Adler (1995) finds that assembling a transition team is essential to foster the transition process. O'Connor, et al. (2002) argue that transition teams should include: members from the development team responsible for the incubation phase; members from the receiving business unit; and one transition management expert. In a similar vein, Leifer, et al. (2000) argue that the transition team should include key members of the development team, members from the receiving unit, and a change expert.

Assigning (Push and Pull) Transition Champions

O'Connor, et al. (2002) also argue that the transition team should be led by a champion within the receiving unit, and the transition process should be perceived as high priority by the firm’s senior-level management. In a similar vein, Leifer, et al. (2000: 153) argue that having “two champions” is critical in this stage: one from the TMT to “push” the
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radical innovation; and one from the receiving SBU to “pull” it. Two main reasons are cited for why forming a transition team led by two champions is essential.

First, O'Connor, *et al.* (2002) find that radical innovation does not completely mature before transitioning it to the operating unit. Due to residual technical, market, organizational, and resource uncertainties, the development team of the receiving unit would not be able to employ tried and true project techniques such as the well-recognized Stage-Gate system. Thus, there is a set of transition activities required to complete the resolution of the residual uncertainties. In other words, and as argued by Veryzer (1998) and Story, *et al.* (2011), the acceleration (prototyping) phase will also require exploration and experimentation skills. In this respect, Adler (1995) find that, while the development team participated in the incubation phase possesses these exploration and exploration skills, this team, in many cases is reluctant to give modifications for the previous project as high a priority as their new product development activities. Second, Veryzer (1998) and O'Connor, *et al.* (2002) find the receiving unit may not only lack the skills to continue developing and refining the product, but also may be reluctant to either complete technical and market development of a radical innovation, or stretch (scale up) its capabilities to suit the innovation. Taken together highlight the critical roles played by the transition team and the pull and push champions. In fact, past research has found that the existence of entrepreneurial champions increase the willingness to cannibalize (Chandy and Tellis, 1998; Herrmann, *et al.*, 2006) and adopt major innovations (Ettlie, *et al.*, 1984; Morris and Westbrook, 1996).

Assessing the Transition and Integration Readiness

It has been mentioned in Chapter 3 that radical innovation is described as competence destroying due to its impact on the existing capabilities and established practices of the radical innovating entity. Hence, it is essential that the transition team develops an effective plan for transitioning and integrating the radical innovation into the chosen SBU. This capability, thus, may be defined as the ability to assess the transition readiness, and develop an effective plan for transiting and integrating the radically new product/service into the current system (O'Connor, *et al.*, 2002; Tax and Stuart, 1997). Tax and Stuart (1997: 115-119) develops a formal, systematic approach, known as the “micro evaluation” and “overall appraisal” approach, which seeks to help service developers in identifying and measuring the degree of change in key service system
elements expected and the level of risk involved. More recently, O'Connor, et al. (2002) introduce what they call the “Transition Readiness Assessment Form (TRAF)”. This tool is intended to help the transition team in resolving 10 issues and uncertainties attributing the acceleration and transition phase.

The TRAF tool seeks to assess the readiness related to several aspects. Examples are: (1) product/system development readiness (e.g., the process for product development has been clarified, and appropriate resources have been budgeted for accomplishing the development plan); (2) operations readiness (e.g., the process necessary for producing the product has been validated, most problems related to operations scale-up has been completed, a pilot production demonstration has been completed); (3) software readiness (e.g., the required software has been developed and debugged, and the software necessary for this product has been validated); (4) partner readiness; (5) clarity of competitive advantage (e.g, the value proposition of this product has been validated in the marketplace); (6) market entry strategy (e.g., a market plan for the product has been developed, distribution channels for the product have been established, the receiving unit is willing to use the business model developed, and a sales forecast has been generated that is based on an understanding of the initial entry market); (7) market development readiness (e.g., the first application market is aware that our product exist, and the market has been adequately educated about the potential of this technology); (8) sales force readiness (e.g, people selected or hired have the appropriate technical knowledge required, and sales campaign has been developed for the initial launch of this product); (9) assessing the receiving unit’s commitment to the project (e.g., senior management in the receiving unit believes that the program is important for the future of the business unit, and the opportunity fits with the strategic intent of the receiving unit); (10) human resources issues (e.g., efforts are being made to acquire new skill sets that are currently lacking in the receiving unit, and performance metrics against which the receiving unit team and receiving unit will be measured are appropriate given the level of risk associated with the project) (O'Connor, et al., 2002: 54-55).

In short, past research has shown that the effective management of the process of transition could enable the radical innovator to foster the transition and adoption process. Past research also suggests that this capability is best captured by three lower-order latent factors. These are: (1) assembling a transition team; (2) assigning (push and
pull) transition champions; and (3) assessing the transition and integration readiness in a formal, systematic way.

5.3.3.2 Implementation

This capability may be defined as *the ability to implement the transition and integration plan set by the transition team* (O'Connor, et al., 2002). It covers the exploration and experimentation activities required to refine and review the product, alongside more exploitative activities, including starting to build infrastructure, operations capabilities, and business processes (Story, et al., 2011; Veryzer, 1998). For example, the development work should be complete, and the operations and the associated technologies must be implemented. This may result in the production of several prototypes. Personnel who will produce, deliver, and sell the radically new service should receive extensive training. The marketing communication tools should be finalized, and should involve significant educational content. Also partners participating on the production and delivery of the new service should be recruited and trained. Furthermore, a pilot run may be needed to get the new service system working smoothly (Atuahene-Gima, 1996; Cooper and Edgett, 1996; Cooper and Kleinschmidt, 1986; Djellal, et al., 2003; Johnson et al., 2000; O'Connor, et al., 2002; Scheuing and Johnson, 1989; Thomke, 2003; Veryzer, 1998). The implementation process should be extended to encompass the current services if they are modified as a result of the integration process (Tax and Stuart, 1997).

5.3.3.3 Introduction

This capability may be defined as *the ability to implement a dynamic plan for launching, reviewing, and rolling out the radically new product*. Story, et al. (2011) state that this step focuses on full scale launch activities, which relate to how radical innovators mobilize the dissemination process, where they scale up production and distribution networks in the context of new market creation. Tax and Stuart (1997: 119) argue that service firms need to recognize the “evolutionary pattern of service introduction”. In all the cases studied, they find that the new services followed what they describe as “an evolutionary process, with considerable learning and reengineering of the design after the initial introduction”. As such, service firms in their study follow the roll out approach, in which a limited set of branches are chosen to introduce the new service, followed by a gradual dissemination to the service. This reflects what Urban
and Hauser (1993) call the fast adaptive control system, in which the launch process is monitored carefully to identify and correct errors and gaps to make sure that the new product is well-based. Other research (e.g., Alam and Perry, 2002; Atuahene-Gima, 1996; Thomke, 2003) also find that the post-launch evaluation procedures are at the core of introduction activities.

In the terminology of the Characteristics-based Approach of innovation (discussed in Chapter 3), this evolutionary process of learning and improvement implies that the subset [(C*)(T*)] mobilized to produce the final characteristics is well established. That is the individuals participating in the production and delivery of the radically new product have developed the skills, and the service provider has developed the capability in the vector (T*). More specifically, this implies improving the structure of the radically new product, ameliorative innovation seeking to enhance capability. As mentioned in table 3.4, this mode of innovation results from learning effects, and seeks to increase the quality of characteristics, while keeping the dominant design unchanged (Gallouj and Weinstein, 1997). McGrath and Ming-Hone (1996) find that a capability is enhanced when the new product/service objectives are met, e.g., quality objectives (speed and reliability); and productivity objectives. In the terminology of evolutionary economics, a well-established capability is called “routine”, which may be defined as “repetitive patterns of actions”, or taken-for-granted (“automatic”) practices (Nelson and Winter, 1982). It encompasses the practices at all levels and in all functions of the new business (Gallouj, 2002). In the sense of Djellal, et al. (2003), routine implies the establishment of all the operations and associated technologies involved in the vector (T*), including the combinatory operations (coordination capability).

5.4 The Performance of Radical Service Innovation

As discussed in Chapter 4, the current research project will adapt dynamic theories of competition when assessing the radical innovation success/performance. As shown in figure 4.2, the conceptualization of these dynamic theories includes three categories of constructs and variables: temporary competitive advantage (TCA); the sustainability of TCA, which includes sustainable competitive advantage (SCA) and imitation barriers; and superior long-term financial performance. In the following sub-sections, I will discuss in depth these three categories of variables.
5.4.1 Temporary Competitive Advantage (TCA)

According to dynamic theories of competition, TCA is said to have two components. The first component is the relative sum of all customer perceived benefits (values) of the market offering (superior, parity, or lower). The second component is the relative cost of producing and delivering this market offering (lower, parity, or higher). The dichotomization of these two components produces three levels of TCA: (1) effectiveness-efficiency advantage (superior value/lower cost); (2) effectiveness advantage (superior value/parity cost); and (3) efficiency advantage (parity value/lower cost) (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999).

As shown in Chapter 4, McGrath and Ming-Hone (1996: 402) is the only study that sought to assess innovation performance in terms of effectiveness-efficiency advantage. They operationalize the effectiveness advantage (superior customer perceived value) as a first-order construct captured by several measures (e.g., the firm can meet new customer needs, the firm can serve entirely new customer segments, customers will get more value than in the past, customer will get more value than from competitors, quality will be better than competitors, and customer will pay a premium price). On the other hand, they operationalize the efficiency advantage (lower cost) as a first-order construct captured by several measures (e.g., cost will be reduced, and greater efficiency than competitors will be achieved). While their study contributes to the innovation literature by adapting and operationalizing the components of TCA, their study focuses on industrial innovation. However, several studies in service innovation and marketing (e.g., Easingwood, 1986; Zeithaml et al., 1985) show that service offerings differ from manufacturing offerings along several dimensions, e.g., services are largely intangible and produced and consumed simultaneously. This has had important implication for the way by which customer perceived value is operationalized in the service context.

Several studies have sought to measure the customer perceived value in the service context. For example, in their cross-sectional study focusing on six service industries (spectator sports, participation sports, entertainment, health care, long distance carriers, and fast food), Cronin et al. (2000: 204) define customer perceived value as “the consumers’ overall assessment of the utility of a product based on perceptions of what
is received and what is given”. In this respect, this concept is operationalized as a first-order construct manifested by two indicators. In their cross-sectional study focusing on the tourism industry, Sánchez et al. (2006) operationalize customer perceived value as a theoretical (multidimensional) construct manifested by six lower-order latent factors. These are: (1) functional value of the travel agency (installations); (2) functional value of the contact personnel of the travel agency (professionalism); (3) functional value of the tourism package purchased (quality); (4) functional value price; (5) emotional value; and (6) social value. In their cross-sectional study focusing on the financial service industry, Roig et al. (2006: 274) operationalize customer perceived value as a theoretical construct manifested by six lower-order latent factors. These are: (1) functional value of the establishment, installations (e.g., the servicescape is spacious and modern, it is easy to find and accessible); (2) functional value contact personnel, professionalism (e.g., the personnel know their job well, and the personnel’s knowledge is up to date); (3) functional value of the service purchased, quality (e.g., the service as a whole is correct, the quality compared with competitors is acceptable); (4) functional value price (e.g., the services is good for the expense it causes me); (5) emotional value (e.g., I feel relaxed, and I feel at easy); and (6) social value (e.g., the fact that I come here looks good to the people I know).

In the current research project, I will adapt the construct developed by Roig et al. (2006) when measuring the customer perceived value (effectiveness advantage). However, while it takes into consideration the complex nature of the customer perceived value in the financial service context, it neglects the value results from the innovation activities. Thus, I suggest that the customer perceived value construct developed by McGrath and Ming-Hone (1996), after dropping the quality items, should be added as another factor underlying the customer perceived value. In other words, it is suggested that the customer perceived value resulting from the RI activity needs to be conceptualized as a theoretical construct manifested by 7 lower-order latent factors. Moreover, I will adopt the construct developed by McGrath and Ming-Hone (1996) when measuring the efficiency advantage.

5.4.2 The Sustainability of Competitive Advantage

The sustainability of competitive advantage includes two concepts: sustainable competitive advantage (SCA); and imitation barriers. The TCA may be short run or
long run. Here, the TCA is said to be sustained when it lasts a longer time (Hunt, 2000a). In other words, the TCA is sustained only if it continues to exist after efforts to duplicate that advantage have ceased (Barney, 1991). However, according to dynamic theories of competition, the TCA cannot be sustained unless a set of imitation barriers exists (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999). In this respect, past innovation research suggests that TCA could be sustained when two imitation barriers exist: (1) when the radical innovator is able to introduce incremental innovations; and (2) when the components of knowledge underlying the radical innovation product are new and complex.

**Incremental (Continuous) Innovation**

As discussed in in details in Chapter 4, the imitation behaviour dominants many service industries in general and the financial service industry in particular (Morris and Westbrook, 1996; Salunke, et al., 2011). The discussion also shows that the radical innovator should continue improving the radically new product/service. Moreover, the radical innovator has to be nimble in responding to the moving customer needs and tastes as well as competitor moves by, for example, adding new characteristics. (Drew, 1995; Story, et al., 2011; Zander and Kogut, 1995). Thus, creating variety and extending the “dominant design” by introducing incremental innovations is critical to “enhance the fitness (degree of adaptation or suitability) of an innovation to its environment” (Gallouj, 2002: 136). It diversifies and differentiates, and introduces new dimensions into the positioning equation that competitors cannot immediately match (Lovelock and Wirtz, 2007). Past research also suggests that if the radical innovator is not able to early/quickly respond to these changing customer needs, competitors may be able to creatively distort the TCA generated from the innovation (Garcia and Calantone, 2002). In fact, failing to adapt threatens the value created by the market offering (Hunt, 2000a). The marketing and organizational learning literature (e.g., Atuahene-Gima, 2005; He and Wong, 2004) also provides support for the argument that firms should be ambidextrous.

**The Newness and Complexity of the Core Components of Knowledge**

It has been argued that RI implies the creation of new business model (value chain), and that the project team should understand, experiment, and define the entire value chain.
and, find a place in this chain that is profitable and has long-run promise (Afuah and Bahram, 1995; McDermott and O’Connor, 2002; O’Connor and DeMartino, 2006). This suggests that the place the radical innovator occupies in this value chain will have an important implication for the ability of this innovator to protect and sustain the TCA. In this respect, past research suggests that when the core components of knowledge underpinning this place are new and complex, the radical innovator would protect the innovation from being imitated.

In the financial service industry, MacMillan et al. (1985: 82) find that new products with revolutionary and complex nature secure a transient “monopoly position”, and increase the “response lag”. In other words, the core components of knowledge, which are uncommon (new) among the competitors, require substantial effort in the design of entirely new procedures and routines. Also, if the new product requires extensive organization of interdependent procedures and/or the coordination of many skills and multiple departments, the product is considered to be complex. In other words, if the core components are highly varied, and reside in different stages of a vertical chain (e.g., operations, and marketing), the innovation is said to be complex. Furthermore, Zander and Kogut (1995: 77) state that “imitation rates are influenced by the extent to which important aspects of the capabilities are possessed by many firms”, and that this capability is complex. In this respect, Complexity insures “system dependence”, capturing the degree to which a capability is dependent on many different (groups of) experienced people for its production”.

5.4.3 Superior Long-term Financial Performance

Superior long-term financial performance is defined as the level of performance exceeding some referent, e.g., the firm's own performance in a previous time-period or that of a set of rival firms (Hunt, 1997b, 2001; Hunt and Morgan, 1995, 1996, 1997). The superior long-term financial performance will be assessed using several objective and subjective measures. This is in line with the generally held view that financial success is a multidimensional construct. However, these objective and subjective measures should be relevant to both the prospector strategy (Griffin and Page, 1996), and the financial service industry. In this respect, past research suggests that the long-term financial performance should be measured by: (1) sales from new products; (2) profits from new products; (3) cross selling (the impact on the profitability and sales of
Chapter 5 The Development of an Analytical Conceptual Framework

the other products/services); (4) growth (e.g., the new product is core, enabling the radical innovator to produce several end products); (5) achievement of learning effects; (6) and corporate reputation (Blazevic and Lievens, 2004; Brown and Eisenhardt, 1995; Cooper, et al., 1994; Cooper and Kleinschmidt, 2007; Dibrell, et al., 2008; Griffin and Page, 1996; Li and Calantone, 1998; Lievens and Moenaert, 2000; McGrath and Ming-Hone, 1996; Menor and Roth, 2008; Moreno and Casillas, 2008; Salomo, et al., 2007; Wiklund and Shepherd, 2003). Having discussed all the constructs and variables included in the analytical conceptual framework (Core RIC, entrepreneurial capability, project management capabilities, and RI success/performance), I will turn now to discussing the relationships linking these constructs and variables.

5.5 The Relations and Rationale

In this section, the relations among the constructs and variables will be suggested, and the rationale will be presented.
5.5.1 Linking Entrepreneurial Capability to Core RIC ($P_1$)

In the current research project, Core RIC is conceptualized as a superordinate theoretical (third-order) construct manifested by five theoretical (second-order) constructs: R&D capability; IT capability; cooperative (networking) capability; managerial systems; and innovation-friendly culture. Moreover, the entrepreneurial (resource building) capability is conceptualized as a theoretical (second-order) construct manifested by three first-order factors: executives as capability patrons; executives as shapers of culture; and executives as architects (engineers). In this respect, past research suggests that the dimensions of the resource building capability are essential to be able to build the Core RIC.
Capability patrons are the network of entrepreneurial executives, who have the ambition to grow organically, and are responsible for building and protecting the capabilities required to compete on innovation (Penrose, 1959). Salunke, et al. (2011) find that service entrepreneurship is essential to build a set of capabilities that will drive service innovation. Davies and Brady (2000) find that building core competences requires a top-down approach, in which strategic managers identify, build, and sustain core competences that will enable the firm to adapt to and shape its environment. The work of Moreno and Casillas (2008) suggests that entrepreneurial executives should have the ambition to grow organically, and that this ambition is essential to design and implement strategies that will enable the firm to: develop new products and technologies; and/or expand through paying attention to new needs and markets. Moreover, other studies suggest that strategic managers are the causal actors who are responsible for building all the innovation related capabilities, including: R&D capability; managerial systems (Herrmann, et al., 2006; Verona, 1999); and cooperative capability. In general, the CBV of the firm assigns a prominent role to the strategic managers and entrepreneurial executives in the development of capabilities underlying the Core RIC. In fact, previous research suggests that lack of capability patrons may prevent undertaking speculative activities intended toward accumulating essential capabilities, like proactive research, and establishing strategic relationships with partners that are believed to be strategically important in the future (Chandy and Tellis, 1998; Story, et al., 2011).

The existence of strategic managers, who are able to shape organizational culture, is also essential. Past research (de Brentani, 2001; den Hertog, et al., 2010; Moorman, 1995; Sørensen, 2002) shows that there are several types of corporate culture, and that a certain type is open to change, and provides an environment that fosters and sustains radical innovation initiatives. However, as stated by several scholars (Lyons, et al., 2007; Morris and Westbrook, 1996; Salunke, et al., 2011; Veryzer, 1998), most of the established manufacturing and service firms focus their development efforts on incremental (continuous) innovations or me-too (imitative) strategies. Thus, the culture of exploitation dominants and this is considered as a barrier for initiating and implementing radical innovation. Lado, et al. (1992) argue that one essential TMT role is to shape the organizational culture to enhance organizational capacity for learning and adaptation. McDermott and O’Connor (2002) states that there is a need for culture change before RI could begin to happen. Leifer, et al. (2001) state that executives;
greatest contribution toward building mature RI competence is to shape corporate culture in ways that make RI natural, accepted, and valued.

The dimension of executives as architectures is also suggested to be able to build the Core RIC. According to the CBV, strategic resources and capabilities (e.g., R&D capability and innovation-friendly culture) are asset stocks that cannot be built instantaneously, due to the attribute of time compression diseconomies. Thus, accumulating a single capability requires a consistent pattern of flow variables (e.g., R&D expenditures) to be able to build the relevant stock of this capability. In other words, the five capabilities underlying the Core RIC are conceived as dynamic resources. Moreover, the accumulation process of core competences is believed to be complex due to the interconnectedness of asset stocks, and the many dimensions underlie each asset stock (Dierickx and Cool, 1989a; Leonard-Barton, 1992). In short, the Core RIC is believed to be dynamic and complex, and that the accumulation of such resource requires the existence of architectures. Makadok (2001) explicitly calls strategic managers that follow the capability-building mechanisms as architectures. Penrose (1959), Lengnick-Hall (1992), Black and Boal (1994), and Miller (1996) argue that strategic managers should not only build and construct single strategic resources, but also bundle and configure these strategic resources to produce a synergetic results. Davies and Brady (2000) and King and Zeithaml (2001) find that the strategic managers of the superior performers and innovators understand well their core competences, monitor them closely, and adjust them continuously to a changing technological and market environment.

All in all, the previous discussion and findings show that the network of executives and strategic managers are responsible for building organizational capabilities that will drive future radical innovations. Moreover, they are also responsible for shaping organizational culture, which is essential dimension within the Core RIC. Furthermore, they are responsible for understanding the complementary among these capabilities and strategic resources, and configuring and bundling them to produce a synergetic result. Based on the previous, it is proposed that:

\[ P_1: \text{The existence of the entrepreneurial (resource building) capability is necessary to accumulate the Core RIC.} \]
5.5.2 Linking Core RIC to Project Management Capabilities (P_{2A-P_{2C}})

**R&D Capability**

As discussed in Chapter 4, two major attributes characterizing the accumulation process of asset stocks are the asset mass efficiencies and time compression diseconomies. The implication of these two attributes is that firms that already have a high initial level of R&D know-how (and any other asset stock within the Core RIC in general and the R&D capability in particular) are often in a better position to make further breakthrough and add to their existing stock of knowledge than firms that have low initial levels of knowledge. In this respect, the accumulation of this initial high level of asset stock cannot be crashed as accumulating a stock requires considerable time because this stock is built through learning and experience (Bharadwaj, *et al.*, 1993; Day, 1994; Dierickx and Cool, 1989a; Knott, *et al.*, 2003). The obvious example is the potential absorptive capacity (one dimension of the R&D capability). The work of Cohen and Levinthal (1990), and Zahra and Nielsen (2002) suggests that accumulating potential absorptive capacity before engaging in radical innovations is essential. Davies and Brady (2000) find that building a potential absorptive capacity, starting the bottom-up learning process, is essential to build and expand core organizational capabilities to compete in new areas of business. Moreover, several scholars (e.g., de Vries, 2006; Story, *et al.*, 2011) find that RIs are developed within a network of partners. In this respect, Pennings and Harianto (1992) argue that the radical innovating entity should develop an initial level of absorptive capacity which diminishes the “threshold for extracting know-how” from its partners during the radical innovation initiative. Without such absorptive capacity, a higher likelihood of innovation failure is expected.

**IT Capability**

IT has been found to represent an integral part of the production and delivery of services, especially in the financial service context (e.g., Barras, 1986, 1990; Drew, 1995; Oliveira and von Hippel, 2011; Sundbo, 1997). Besides this, accumulating a high level of IT capability before initiating radical innovation is found to be critical. Barras (1986, 1990), Pennings and Harianto (1992), Morris and Westbrook (1996), and Windrum and García-Goñi (2008) demonstrate that service firms cannot introduce and/or adopt radical technological innovation without accumulating technological
capability, e.g., a fund of knowledge and a stock of applications software and databases. In a similar vein, Gallouj (2002) suggest the knowledge embodied in capital goods and components could provides service developers with appreciable characteristics (breakthrough ideas) that would driver radical innovations.

Other studies also show that IT capability plays an essential role even if the radical innovation will not be around IT. For example, Drew (1995) finds that accumulating a stock of IT knowledge, software, and hardware accelerates the development process in the financial service industry. Froehle, et al. (2000) argue that IT helps in: (1) keeping of and searching in a huge stock of information regarding the internal and external environment which facilitate the generation of innovative ideas; (2) reducing error and redundancy within the development process; (3) improving communication flows between members participating in the innovation project; (4) improving inter- and intra-organizational coordination of innovation activities; (5) streamlining the service design process; and (6) speeding up the service development cycle.

Moreover, it has been found that the direction phase requires a high degree of creativity and knowledge creation to produce breakthrough ideas and concepts (e.g., O’Connor and DeMartino, 2006; Story, et al., 2011). In this respect, Nonaka et al. (2001) and Nonaka (2007) large scale databases plays a critical role in the combination mode of knowledge conversion in which explicit (codified) knowledge is collected from internal and external sources, and then is combined, edited, or processed to form a more complicated and systematic sets of explicit knowledge. Furthermore, it has been found that radical innovators seek to accumulate step-functional learning, especially during the incubation phase. In this respect, Tippins and Soh (2003) find that accumulating IT capability is positively related to organizational learning (e.g., information acquisition, information dissemination, and shared interpretation). Furthermore, radical innovation scholars (e.g., O’Connor, 1998; Story, et al., 2011; Veryzer, 1998) find that incorporating customers during the incubation phase is essential to reduce the market uncertainties, and incorporating customer feedback (e.g., through customer trials) during the last steps of the acceleration phase is essential. In this respect, Nambisan (2002) argues that accumulating IT capability facilitates the creation of virtual user communities through which customers can play the valuable roles of co-creator and product testers.


Cooperative (Networking) Capability

The majority of industrial and service innovation literature stress the roles played by suppliers and partners, including governmental entities, in the development of the radical innovations (e.g., de Vries, 2006; Herrmann, et al., 2006; Pennings and Harianto, 1992; Story, et al., 2011; Whitley, 2000; Windrum and García-Goñi, 2008). For example, Pennings and Harianto (1992) and Ordanini and Parasuraman (2011) find that service firms cannot innovate radically without establishing strategic relationships with germane partners and suppliers. Herrmann, et al. (2006) find that radical innovators form a cluster of suppliers (a very closely-knit community) from completely different fields of business to cooperate in producing radical innovation. Story, et al. (2011) suggest that the would-be radical innovators need to establish strategic relationships with germane suppliers and partners before the initiation of radical innovations for two main reasons. First, suppliers and partners play essential roles in building nearly all the capabilities underlying the direction-incubation-acceleration project management framework. In fact, in one of their cases studies, one supplier played all the activities related to the direction phase. Second, this networking capability cannot be build during the RI development due to the complex, dynamic, and uncertain environment of the development process.

The fact that suppliers and partners can play active role during the directions phase, including the idea generation, represents a valuable opportunity to radical innovators, especially that, as found by O'Connor and DeMartino (2006) generating RI opportunities with high quantity and quality are found to be “sorely lacking” in established companies. Even if the suppliers and partners will not provide the radical innovator with breakthrough ideas, their participation in the idea generation stage is believed to be essential. Nonaka et al. (2001) argue that when suppliers and partners are included in the idea generation step, the spiral process of knowledge conversion takes place, and the number of ideas expands in quality (creativity) and quantity (abundance).

Managerial Systems

Managerial systems are seen as important drivers for innovation (Stringer, 2000; Verona, 1999). For example, Leonard-Barton (1992) argue that managerial systems play an essential roles in creating and controlling knowledge flows. She argues that tailored incentive systems should encourage the innovative activities, and educational and training programs should be compatible with and also motivates the future
innovation activities and projects that will enable the firm to create new core operational capabilities. She argues that if the managerial systems do not encourage and prepare the firm to move, through a portfolio of unaligned (major) innovation projects, from the current core operational capabilities toward new core operational capabilities, the current core capabilities will become core rigidities. Lengnick-Hall (1992) argues that contingent rewards and incentive systems that match risks should be designed to foster intrapreneurship. In a similar vein, Souitaris (2002) find that extensive incentives should be designed to encourage employees to contribute towards new ideas. Djellal and Gallouj (2001) find that 23.3 percent of the service firms in their sample identify conferences, newspapers, and academic journals as important/very important source of innovation ideas. In this respect, Leifer, et al. (2000) argue that incentives that encourage individuals to do research, write papers, and attend conferences bring valuable flows of knowledge into the idea generation step. Such a managerial system also gives idea generators the opportunity to validate their ideas through professional colleagues. In addition, substantive bounce scheme for team members, and career development for champions provide favorable organizational context for entrepreneurs to take risk usually associating the radical innovation phases, especially the incubation phase.

While the previous studies shed light on the impact of managerial systems on the early phases of RI development (direction and incubation), other studies show that managerial systems have a positive impact on the late phases of development (acceleration). For example, Herrmann, et al. (2006) suggest that establishing appropriate incentives for employees and designing suitable training programs are essential to increase the willingness to cannibalize and adopt radical innovations. In a similar vein, Morris and Westbrook (1996) argue that human resource practices should support the adoption of major technological innovation in the banking sector. The work of Atuahene-Gima (1996) also suggests that training proficiency should be accumulated to train operations, sales, and front-line personnel before launching the new service. In short, past research suggests that managerial systems do not only complement other dimensions underlying the Core RIC, but also drive future major innovations.

**Innovation-friendly Culture**

Corporate culture is found to be another aspect relating to the successful development and implementation of radical innovation. For example, de Brentani (2001), Sethi
(2001), and Smith et al. (2005) find that organizational culture that encourage entrepreneurship and risk taking has a positive impact on the capability to create new knowledge, and thus leads to a greater degree of innovativeness. Moreover, Sørensen (2002), Lyons, et al. (2007) and den Hertog, et al. (2010) argue that if organizational culture does not support creativity, experimentation, and prototyping, service firms cannot manage the innovation activities in a sustained way. Furthermore, Verona (1999) argues that organizational culture that promote knowledge sharing and integration, not only between internal actors, but also with external entities, is essential to manage innovation in a sustained way. In this respect, it has been shown that creativity, internal and external knowledge sharing and integration, and experimentation and prototyping, all are major themes of the direction and incubation phases of the radical innovation development (e.g., O'Connor and DeMartino, 2006; Story, et al., 2011; Veryzer, 1998). Corporate culture is also expected to have a positive impact on the acceleration phase. For example, one dimension of the innovation-friendly culture is to be low in resistance to change (Moorman, 1995). In this respect, this dimension is believed to be necessary, especially for the acceleration phase which implies canalizing the current operational practices and establishing new ones (Herrmann, et al., 2006). As mentioned repeatedly, RI is described as competence-destroying.

Generally speaking, if the contents of corporate culture do not include the four dimensions identified earlier, it is expected that the team members participating in the three phases of RI development will struggle. Dougherty and Hardy (1996) and Leifer, et al. (2000) argue that the lack of a supportive culture will heighten what they call “project-to-organization uncertainties”. These include organizational and resource uncertainties. Organizational uncertainty stems from a fundamental conflict between the mainstream organization and the project teams and the difficulty of managing the relationship between them. This may include struggles related to defining the relationships with, managing the expectations of, and insuring the continuous support of the other internal actors, especially the TMT. Resource uncertainty may include difficulties in gaining access to internal and external expertise, and generating adequate budgetary support. In short, the creation of an innovation-friendly culture for entrepreneurial individuals enhances the performance of radical innovation project.

All in all, the accumulation of the five capabilities and strategic resources underlying the Core RIC, which are conceived as complementary asset stocks that cannot be
adjusted instantaneously, is expected to be critical for building the project management capabilities. In other words, building the Core RIC is expected to make the course of these innovation projects shorter, less circuitous, less expensive, and more certain. Based on the previous argument, it is proposed that:

\[
\textit{P}_2: \text{ The existence of Core RIC is necessary for building the direction capability } (\textit{P}_{2A}); \text{ the incubation capability } (\textit{P}_{2B}); \text{ and the acceleration capability } (\textit{P}_{2C}).
\]

5.5.3 Linking Project Management Capabilities (\textit{P}_3 \text{ and } \textit{P}_4)

The attribute of asset mass efficiencies (Dierickx and Cool, 1989a) has an important implication for these relationships, in that the output of each phase is the input for the next one (e.g., the generated, tried, and tested knowledge of each phase is carried to the next one), and thus building the capability of each phase is essential to build the next phase capability. Past research is consistent with this claim, and shows that the development of radical innovation has an evolutionary nature (e.g., Nelson and Winter, 1977). Veryzer (1998) finds that there is an extremely high degree of technological and market uncertainties, and that the reduction of these uncertainties results in “a sequence of innovations”. Davies and Brady (2000) find that the organizational learning process associating the development and implementation of radical innovations is path dependent. The work of Salomo, \textit{et al.} (2007) suggests that the proficiency of managing the direction phase is causally linked to the incubation phase.

For example, when developing their evolutionary conceptual models, Adler (1995) and Salomo, \textit{et al.} (2007) elaborate on information processing theories to show that the activities of developing major innovations seek mainly to gradually reduce uncertainties and validate assumptions though gathering information. I will use the same example to suggest the relationships linking the direction-incubation-acceleration capability framework. It is expected that the opportunity recognition step (e.g., articulating a clear product concept and securing early validation for this concept from internal and external sources) is necessary for building the incubation capability. Thus, if the opportunity recognizer is not able to create the chain of reaction required to validate assumptions, the incubator team would face a greater degree of difficulty and ambiguity during the incubation phase. Moreover, if the incubator team is not able to solve most of the
technical and market uncertainties or learning disabilities exist, many residual uncertainties will exist, and the transition team will face more difficulties in completing the development activity, and the receiving SBU will face more difficulties in developing the market. In short, lacking a capability in the preceding phase has a negative impact on the following one. Contrarily, building a higher capability in the preceding phase is a critical success factor for the next one (Adler, 1995; Gallouj, 2002; Leifer, et al., 2000; Tax and Stuart, 1997). Based on this argument, the following relationships are proposed:

**P₃:** The existence of the direction capability is necessary for building the incubation capability.

**P₄:** The existence of the incubation capability is necessary for building the acceleration capability.

### 5.5.4 Linking Acceleration Capability to TCA (P₅A-P₅C)

It is expected that both the effectiveness and/or efficiency advantages are the outcome of building a superior acceleration capability. Regarding the first six dimensions of effectiveness advantage, Cronin *et al.* (2000) find that introducing services with higher quality has a positive impact on the customer perceived value. Sánchez *et al.* (2006) and Roig *et al.* (2006) state that the customer “perceived value is the essential result of marketing activities”, which are undertaken during the acceleration phase. Other studies suggest that these six value propositions and dimensions within the customer perceived value are also explained by the acceleration capability. For example, the significant educational content, which is designed during the implementation step, adds value. In general, the advertising campaign does not only raise customers’ awareness of the new product and its characteristics, and offer them incentives to make the necessary changes in their behavior, but also facilitates the accumulation of knowledge and the development of skills required to play their co-production role. (Please note that “demand” is not taken as “given but rather as something he [the entrepreneur] ought to be able to do something about” (Penrose, 1959: 80).) Furthermore, giving extensive training to personnel (especially front-line employees), and designing fast adaptive control system (seeking the identification and correction of errors and gaps) enhance the professionalism and product quality, two factors within the customer perceived value.
Regarding the last dimension of the customer perceived value, McGrath and Ming-Hone (1996) find that the development teams, which develop new superior capabilities and embed them in superior products/services (in terms of quality, reliability, speed, and overall performance), generate customer distinctive value. In a similar vein, it has been argued by several scholars (Gallouj and Weinstein, 1997; McDermott and O'Connor, 2002; O'Connor and DeMartino, 2006; O'Connor, et al., 2002) that the radically new product/service either satisfies unmet customer needs, or improves the known performance features by of 5-10x or greater. In short, the previous studies suggest that the development and marketing activities, which are conceptualized as dimensions underlying the acceleration capability in the current research project, explain the customer perceived value.

Regarding the efficiency advantage, some radical innovations result in a significant reduction in cost, 30-50% or greater (McDermott and O'Connor, 2002; O'Connor and DeMartino, 2006; O'Connor, et al., 2002). Moreover, many dimensions underlying the acceleration capability explain the efficiency advantage. For example, establishing the routine increases the efficiency of the individual/organizational performance, and as such reduces the cost of producing and delivering the new product. This would enable the radical innovator to generate efficiency advantage (Bharadwaj, et al., 1993; e.g., Hunt and Morgan, 1995; Kerin et al., 1992; Lado, et al., 1992; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Reed and DeFillippi, 1990; Spender, 1994; Stalk et al., 1992). This type of CA may be known as “Penrose rent” and results more from the coordination capability or more precisely “synergy” (Spender, 1994, 1996), which cannot be achieved when the radical innovator lacks the acceleration capability. In short, the previous discussion and findings show that the effectiveness and/or efficiency advantage is the outcome of accumulating superior acceleration capability. Based on the previous argument, the following relationships are proposed:

\[ P_5: \text{The existence of superior acceleration capability is necessary for generating effectiveness/efficiency advantage (P_{5A}); effectiveness advantage (P_{5B}); or efficiency advantage (P_{5C}).} \]
5.5.5 Linking TCA to Sustainability of this TCA ($P_6$, $P_{7A}$-$P_{7B}$)

The TCA is said to be sustained when it lasts a longer time, and the attempts of competitive duplication are ceased. In this respect, it might be expected that the effectiveness advantage established through introducing substantial customer value and making the head start would continue to persist. Also, as far as the word routine is concerned, the efficiency advantage would be sustained. As Grant (2002: 236) stats, “the first mover can build a cost advantage by moving down the industry learning curve faster than followers”. This suggests that the radical innovator, as a first-mover, would be able to sustain the TCA created. However, according to dynamic theories of competition, the TCA cannot be sustained unless a set of imitation barriers exists, hence the essential role played by imitation barriers in moderating the TCA-SCA relationship (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999). In other words, due to the fierce competition, dynamic theories of competition (e.g., Bharadwaj, et al., 1993; Kerin, et al., 1992) suggest that the CA-SCA is a contingent (not a universalistic) relationship. In this respect, the innovation literature suggests that the ability of the radical innovator to sustain the TCA is contingent on its ability to protect the innovation from being imitated. As discussed previously, it is believed that innovation is said to be protected when: (1) the radical innovator is able to introduce incremental innovations; and (2) when the components of knowledge underlying the radical innovation product are new and complex. Based on this, the following contingent and moderating relationship are proposed:

\[ P_6: \text{The TCA-SCA relationship is contingent on the ability of the radical innovator to protect innovation from being imitated.} \]

\[ P_{7A-7B}: \text{The newness and complexity of the core components of knowledge moderate the TCA-SCA relationship. The ability of the radical innovator to introduce continuous innovations moderates the TCA-SCA relationship.} \]

5.5.6 Linking SCA to Superior Long-term Financial Performance ($P_8$)

According to the dynamic theories of resources-based competition, the superior financial performance is presented as the ultimate outcome variable, and that the
establishing SCA is critical for this superior financial performance to last a longer time. In other words, the superior long-term financial performance is explained by the SCA the radical innovator creates (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Kerin, et al., 1992; Madhavaram and Hunt, 2008; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999). Based on these theories, it is proposed that:

\[ P_8: \text{The SCA is a key to generate superior long-term financial performance.} \]

### 5.6 Knowledge Gaps and Theoretical Contribution

A set of knowledge gaps and deficiencies are identified in Chapter 4. Moreover, an analytical conceptual framework has been developed, seeking to fill in these knowledge gaps. Table 5.1 revisits these knowledge gaps to show how the proposed conceptual framework fills in them.
## Table 5.1: Key Knowledge Gaps and Theoretical Contribution

<table>
<thead>
<tr>
<th>Knowledge Gaps and Deficiencies (As identified in Ch 4)</th>
<th>The Analytical Conceptual Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Core NPD competence is conceptualized as a multidimensional construct manifested by four interrelated, independent knowledge dimensions: (1) the skills and knowledge embodied in people; (2) knowledge embedded in technical systems; (3) managerial systems; and (4) corporate culture (Leonard-Barton, 1992).</td>
<td>-Core RIC is conceptualized as a superordinate theoretical construct manifested by five second-order reflective dimensions: (1) R&amp;D capability; (2) IT capability; (3) cooperative (networking) capability; (4) managerial systems; and (5) innovation-friendly culture. Moreover, the complementarity among the five capabilities has been discussed, and the first-order latent factors underlying each capability are suggested. -This is believed to be a significant re-conceptualization of the Core NPD capability.</td>
</tr>
<tr>
<td>-Despite the wide spread use of the term, past research does not either elaborate and further develop the dimensions of the core NPD capability, or extend this concept to radical innovation in the service context.</td>
<td></td>
</tr>
<tr>
<td>-Past entrepreneurship, innovation, and strategic management research is mainly concerned with the role of strategic managers in allocating and deploying, or creating resources (capabilities and competences) during the radical innovation initiatives (projects).</td>
<td>-Entrepreneurial (resource building) capability is suggested to be conceptualized as a theoretical construct manifested by: (1) capability patrons; (2) shapers of culture; and (3) architectures. -This is believed to be an original construct.</td>
</tr>
<tr>
<td>-Thus, how strategic managers and entrepreneurial executive build resources that have long-term nature has remained in a black box. In general, dynamic (evolutionary) theories of resource accumulation are ignored.</td>
<td></td>
</tr>
<tr>
<td>-Moreover, few studies (Moreno and Casillas, 2008; Salunke, et al., 2011) elaborate on the conventional (static) dimensions of entrepreneurship orientation (EO), innovativeness, proactiveness, and risk taking, when examining the role of strategic managers and entrepreneurial executives in building key variables and capabilities driving radical innovation.</td>
<td></td>
</tr>
<tr>
<td>-Past quantitative research sough to examine the development process of RI find that the well known Stage-Gate system is insignificant in explaining RI success/performance in the service and industrial contexts.</td>
<td>-The direction-incubation-acceleration capability framework has been elaborated. Each capability has been conceptualized as a theoretical (higher-order) construct manifested by a set of lower-order dimensions. -These are believed to be original constructs.</td>
</tr>
<tr>
<td>-Past qualitative research (O'Connor and DeMartino, 2006; Story, et al., 2011) has developed the direction-incubation-acceleration capability framework of radical innovation management. However, this framework is developed based on case studies in industrial radical innovation, and also has remained descriptive.</td>
<td></td>
</tr>
<tr>
<td>-Nothing is virtually known about the financial performance of RI.</td>
<td>-Dynamic theories of competition are adapted to measure the success/performance of RI. -Imitation barriers, moderating the TCA-SCA relationship, are suggested,</td>
</tr>
<tr>
<td>-(Innovation) scholars have tended to develop new variables and constructs for assessing innovation success/performance. However, the majority of these constructs lack competition theory. Moreover, the proliferation of these concepts and measures has caused confusion and impeded the theoretical and empirical advance of the success assessment. -Nearly all these variables and constructs are static, not dynamic. -Imitation barriers are always ignored.</td>
<td></td>
</tr>
<tr>
<td>-There is a lack of dynamic conceptual framework for the key capabilities and competences of RI success in both the service and industrial contexts. In other words, cross-sectional research designs dominate the entrepreneurship, innovation, and strategic management research. However, it is generally described as being inherently static.</td>
<td>-The current research project will employ a longitudinal research methodology when developing this dynamic conceptual framework.</td>
</tr>
<tr>
<td>-When building their conceptual models, the majority of conceptual and empirical studies reviewed elaborate on either the RBV, or the dynamic capability-based view. Very little research elaborates on the key principles of the CBV.</td>
<td>-The current research elaborates on the key (evolutionary) theories of the CBV discussed in Chapter 4.</td>
</tr>
</tbody>
</table>

**Source:** Self.

Two main points need to be made regarding table 5.1. First, creating original constructs or significantly re-conceptualizing old ones represents the highest level of theoretical contribution as they create a radical departure from existing work by generating a
number of new research directions that can shape future thinking (Colquitt and Zapata-Phelan, 2007). Second, developing dynamic (evolutionary), integrative conceptual frameworks represents another theoretical contribution, and several notable scholars have been calling for developing such conceptual frameworks as the development of these frameworks can push the development of more “rigorous theory” by enabling future research activities on a quantitative basis (e.g., Chandy and Tellis, 1998; Kraaijenbrink, et al., 2010; Lengnick-Hall, 1992; Porter, 1991: 98).

5.7 Summary

Guided by the dynamic theories of resource accumulation and resource-based competition discussed in Chapter 4, I have sought to suggest a multi-layer, analytical conceptual framework on the key capabilities and competence of RI performance. I have discussed in-depth the dimensions of the: Core RIC; entrepreneurial (resource building) capability; and radical innovation project management capabilities (direction, incubation, and acceleration). Moreover, I have discussed in depth the constructs intended to assess the performance of RI in the service context: temporary competitive advantage (TCA); sustainable competitive advantage (SCA); imitation barriers; and superior long-term financial performance. Furthermore, I have also developed the theoretical propositions, linking these key capabilities and competences to RI performance. It is suggested that the entrepreneurial capability is causally linked to the Core RIC, which is causally linked to the direction, incubation, and acceleration capabilities. It is also suggested that the acceleration capability is causally linked to the TCA. Moreover, it is also suggested that the TCA-SCA relationship is moderated by two imitation barriers (the ability to continuously introduce incremental innovations, and the degree to which the knowledge underlining the radical innovation is new and complex). Finally, it is suggested that the SCA predicts the superior long-term financial performance. I have also revisited the set of research gaps and deficiencies identified in Chapter 4 to show how the analytical conceptual framework fills in these gaps and deficiencies. This analytical conceptual has two main advantages. First, it will guide the data collection process. Second, it will guide the data analysis process.

In Chapter 6, I will outline the methodological approach adopted in the current research. I will discuss in details the longitudinal research design employed to answer the research inquiry identified in Chapter 1.
Chapter 6 The Research Methodology

The overall aim of this chapter is to present the research methodology employed in the current research project. I will adopt the “research onion” introduced by Saunders et al. (2009: 108) when discussing seven research layers (summarized in Table 6.1). This chapter is organized in ten sections. In sections one-seven, I will discuss in details: the research philosophy; research approach; research strategy; research choice; time horizon; data collection techniques; and data analysis procedures. In section eight, I will present the quality criteria for the research design. Moreover, I will present and discuss in details the tactics implemented to insure the credibility of this research design. In section nine, I will list the obstacles confronted when undertaking the case study. In section ten, I will provide a summary for the chapter.

<table>
<thead>
<tr>
<th>The layers of the onion</th>
<th>The choices made</th>
</tr>
</thead>
<tbody>
<tr>
<td>The research philosophy</td>
<td>-The interpretivism/constructionism paradigm.</td>
</tr>
<tr>
<td>The research approach</td>
<td>-Induction (theory building).</td>
</tr>
<tr>
<td>The research strategy</td>
<td>-Exploratory/explanatory case study.</td>
</tr>
<tr>
<td>The research choice</td>
<td>-Multi-method qualitative study (three data collection techniques; and two data analysis strategies).</td>
</tr>
<tr>
<td>Time horizon</td>
<td>-Retrospective process (longitudinal) data.</td>
</tr>
<tr>
<td>Data collection techniques</td>
<td>-Semi-structured interviews, documents, and direct observation.</td>
</tr>
<tr>
<td>Data analysis procedures</td>
<td>-A common framework that involves two strategies: process narrative; and synthetic.</td>
</tr>
</tbody>
</table>


6.1 The Research Philosophy

Research paradigm may be defined as “the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways” (Guba and Lincoln, 1994: 105). Thus, it is a “way of examining social phenomena from which particular understandings of the phenomenon can be gained and explanations attempted” (Saunders, et al., 2009: 118). Several methodologists explore several research philosophies through the concept of research paradigm, and link several philosophies to important questions related to ontology, epistemology, axiology, and data collection methods. For example, Guba and Lincoln (1994) differentiate between positivism, critical realism, critical theory, and constructionism. Saunders et al. (2009) differentiate between positivism, realism, interpretivism, and pragmatism. Robson (2011) states that positivism and
constructionism are the most widely adopted philosophical positions within the social science. Thus, although the current research project adopts the constructionist stance, it might be useful to compare between these two research stances. Tables 6.1 compares between these two philosophical positions.
## Table 6.2: A Comparison of Two Research Philosophies

<table>
<thead>
<tr>
<th></th>
<th>Positivism</th>
<th>Interpretivism/Constructionism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontology</strong></td>
<td><em>Naïve realism: external, objective, independent, apprehendable, single</em></td>
<td><em>Relativism: subjective, socially constructed, apprehendable, changing, multiple realities.</em></td>
</tr>
<tr>
<td></td>
<td><em>reality.</em></td>
<td><em>Realities are apprehendable in the form of multiple, intangible mental constructions,</em></td>
</tr>
<tr>
<td></td>
<td>-The world consists of objective, material things. It is the world of the</td>
<td>-socially and experimentally based, and local and specific in nature. Thus, it is dependent</td>
</tr>
<tr>
<td></td>
<td>senses.</td>
<td>for their form and content on the individual persons or groups holding the constructions.</td>
</tr>
<tr>
<td></td>
<td>-The reality is independent of (external to) social actors concerned with</td>
<td>-These constructions are “alterable” as are their associated realities. In other</td>
</tr>
<tr>
<td></td>
<td>their existence.</td>
<td>words, the social phenomena are in a constant change of revision.</td>
</tr>
<tr>
<td></td>
<td>-An apprehendable reality is assumed to exist, driven by immutable natural</td>
<td>-These multiple realities might be conflicting.</td>
</tr>
<tr>
<td></td>
<td>laws and mechanisms.</td>
<td></td>
</tr>
<tr>
<td><strong>Epistemology</strong></td>
<td><em>Objectivist: findings true.</em></td>
<td><em>Transactional/Subjectivist: created findings.</em></td>
</tr>
<tr>
<td></td>
<td>-Reality is represented by objects that are considered to be real. Thus,</td>
<td>-Subjective meanings can provide acceptable knowledge. The researcher and</td>
</tr>
<tr>
<td></td>
<td>the data collected are credible and objective (less open to bias). Knowledge</td>
<td>the object of investigation are assumed to be interactively linked so that the</td>
</tr>
<tr>
<td></td>
<td>of the “way things are” is conventionally summarized in the form of time-</td>
<td>findings are literally created as the investigation proceeds (participants are viewed as</td>
</tr>
<tr>
<td></td>
<td>and context-free generalization”.</td>
<td>helping to construct the reality with researchers).</td>
</tr>
<tr>
<td></td>
<td>-Scientific knowledge is the discovery of scientific laws, and is the basis</td>
<td>-Scientific knowledge is socially constructed by the scientific community.</td>
</tr>
<tr>
<td></td>
<td>for the establishment of truth.</td>
<td>Knowledge is relative, not absolute.</td>
</tr>
<tr>
<td></td>
<td>-The focus, thus, is on causality and law-like generalizations, and reducing</td>
<td>-The focus, thus, is on deconstructing and understanding the social</td>
</tr>
<tr>
<td></td>
<td>phenomena to simplest elements. Thus, the basic posture is to be both</td>
<td>constructs by emphasizing the details of situation, the reality behind these</td>
</tr>
<tr>
<td></td>
<td>“reductionist and deterministic”.</td>
<td>details, and subjective meanings motivating actions. In this respect, rich</td>
</tr>
<tr>
<td></td>
<td>-Replicable findings are, in fact, true. In other words, verified</td>
<td>insights into the complex social world are essential.</td>
</tr>
<tr>
<td></td>
<td>hypotheses established as facts or laws.</td>
<td>-The phenomena of interest tend to be “fluid social constructions, rather than</td>
</tr>
<tr>
<td><strong>Axiology</strong></td>
<td><em>Value-free (dualist).</em></td>
<td>firm facts”. Thus, “constructions are not more or less true”, “but simply</td>
</tr>
<tr>
<td></td>
<td>-Research is undertaken in a value-free way. The investigator and the</td>
<td>more or less informed and/or sophisticated”.</td>
</tr>
<tr>
<td></td>
<td>investigated object are assumed to be independent entities. In other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>words, the researcher is independent of the data and maintains an</td>
<td></td>
</tr>
<tr>
<td></td>
<td>objective stance, passive observer. Inquiry, thus, takes place as through</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a “one-way mirror”.</td>
<td></td>
</tr>
<tr>
<td><strong>Data collection</strong></td>
<td><em>Highly structured, large samples, measurement, quantitative.</em></td>
<td><em>Small samples, in-depth investigation, qualitative.</em></td>
</tr>
<tr>
<td>techniques most</td>
<td>-There is heavy reliance on quantitative methods following a scientific</td>
<td>-Almost all research undertaken uses qualitative data collection methods.</td>
</tr>
<tr>
<td>often used</td>
<td>approach in which a theory is developed, and a fixed type of research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>design is followed to test the theory (methodological stricture).</td>
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</tbody>
</table>

The current research project is situated within the **interpretivist/constructionist paradigm**. As shown in the previous table, there are a set of very general philosophical assumptions that tend to be shared by researchers working within the tradition as follows. “There is not a single knowable reality waiting out there to be discovered via the scientific method”. The reality is the participant’s perception. As there are multiple perceptions, there are multiple realities. Therefore, the same event may have multiple realities as individuals or groups pay attention to different things, and may interpret the same things in different ways. Moreover, the construction of knowledge does not only have a cognitive dimension, but also has a social dimension (when the interpretations are shared within the relevant group). Thus, these multiple realities might be conflicting when these multiple groups and individuals hold competing interpretations. Furthermore, these multiple realities are continually constructed (changing) as these individuals and groups make sense of the world and construct their own version of reality. In short, on the ontological level, participant’s perception is the reality itself, and the reality is relative (the “relativity thesis”). On the epistemological level, there is not “absolute and unitary knowledge of the world”, “truth [genuine knowledge] is a subjective evaluation”, and scientific knowledge is socially constructed. Thus, “scientists do not discover anything about the world”, “scientists create reality”, and “science create many realities” (Guba and Lincoln, 1994; Hunt, 1990: 2; Saunders, *et al.*, 2009; Seoudi, 2009).

At the start of the current research project, I was subscribing to the positivist’s world. (Please note that, as a researcher, I had grown up within an academic environment dominated by the positivist view.) During the current research project, I had gradually moved from one extreme (positivism) to the other (constructionism). While there is no philosophical position is better than another as the different philosophical positions are “better at doing different things” (Saunders, *et al.*, 2009: 108-109), constructionism is consistent with the current research for two main reasons, as shown below.

**First**, the current research adopts the competence-based view of the firm. As shown in table 4.5, the environment is conceived as subjective and changing, proactive organizations have a maximal degree of strategic choice, and executives and strategic managers are entrepreneurs, who synthesis and create. This view, thus, is more consistent with the constructionist position. As argued by Markus and Robey (1988) and Burnes (2004), constructionists do not deny the changing nature of the world, and
concentrate on the way human beings attempt to shape their world (organizations and environment). Here, the social actors (strategic managers) are not powerless. Rather, they have a choice, and the deterministic view is rejected. Here, as stated by Penrose (1959: 42), Daft and Weick (1984), and Lumpkin and Dess (1996) the objective (observed) internal and external environment is not relevant. It is the subjective environment created in the cognition of the entrepreneurs that need to be investigated. In other words, it is the cognitive construction of the social actors (the “image in the entrepreneur’s mind”) that determine their actions, and how they shape and enact their environment. Put it differently, entrepreneurs see what others, including scholars, do not see, and it is the former view that needs to be captured to be able to understand the phenomena. Second, constructionist is also more consistent with the qualitative longitudinal research design employed, in which narrative will be used as organizing device (Langley, 1999). In this respect, narratives do not only contain chronology (sequenced events), but also “other indicators of content or context”, “a variety of textual devices that are used to indicate time, place, attributes of the characters, attributes of the context, and so on” (Robson, 2011; Van de Ven and Poole, 2005: 1386). Such a rich understanding about the context represents one core statement within the epistemology of the constructionist approach (as shown in table 6.2).

In short, the current research project seeks to capture the subjective view of the entrepreneurs, and to understand how they build, configure, bundle, and maintain organizational resources. Therefore, the constructionist stance is believed to be more relevant when addressing the research inquiry and meeting the research objective. As stated by Saunders, et al. (2009), “which is better depends on the research questions” sought to be answered.

6.2 The Research Approach

Two different approaches may be followed when conducting research: deduction (or theory testing); and induction (or theory building). In the former, the researcher seeks to develop theory and hypotheses and design a highly structured research strategy (or fixed design research strategy) to test these hypotheses, while, in the latter, the researcher seeks to build theory and propositions and use flexible design research strategy. Here, the choice lies on two important criteria: the nature of the research topic; and the purpose of the research project (Robson, 2011; Saunders, et al., 2009). As
shown in the research problem in Chapter 1, research that seeks to address the key capabilities and competences of radical innovation success in the service context is rare. Yin (2009: 37) states that if the “knowledge base” of the subject is “poor”, and the available literature will not provide “hypotheses of note”, it does not lend itself to the development of “good theoretical statements, and any empirical study is likely to assume the characteristic of an “exploratory study”. Hence, the main purpose of the current research was to explore to be able to explain. In other words, the main purpose of the current research is to build theory.

6.2.1 Developing Theory Prior to Data Collection

Within the induction approach, however, the process of theory building may be conceived as a continuum based on the degree of “inductive purity”. For example, some researchers may prefer to approach the topic with a high degree of inductive purity by developing “tacit theory” about what might be going on and how it might be understood. Thus, these researchers do not seek to develop “theoretical propositions” (theoretical constructs and proposed relationships between them). Contrarily, other researchers prefer developing theoretical propositions before approaching the empirical investigation, and thus make their framework and the associated choices (e.g., instrumentation) more “explicit”. Although the aim of both researchers is to end up with a theory, the former camp prefers to adopt the classic form of “grounded theory” strategy, while the latter one prefers to adopt the “case study” strategy (Eisenhardt, 1989; Glaser and Strauss, 1967; Miles and Huberman, 1994: 22-23; Robson, 2011: 65-66; Yin, 2009: 35-36).

Yin (2009: 36) states that “theory development prior to the collection of any case study data is an essential step in doing case studies”. Here, the goal is to have a “sufficient blueprint” for the study. Robson (2011: 67) states that “developing a conceptual framework forces you to be explicit about what you think you are doing. It also helps you to be selective, to decide which are the important features, which relationships are likely to be of importance or meaning, and hence what data are you going to collect and analyze”. Saunders, et al. (2009) state that developing a conceptual framework has two advantages. First, it will shape the data collection questions asked to the research participants. Second, it will serve as an analytical framework.
The use of conceptual framework as an analytic technique is well recognized in qualitative research (e.g., “thematic coding” based on “template analysis” in the terminology of Robson (2011: 475), and the “logic model” in the terminology of Yin (2009: 149)). The proponents of the first camp (grounded theory) may argue that such preconceptions can bias the researcher toward some aspects of the data, perhaps leading the researcher to ignore other potentially important themes. The alternative view is that prior engagement with the literature can enhance the analysis by sensitizing the researcher to features of the data that might otherwise be missed (Robson, 2011). It should be noted, however, that developing a conceptual framework does not contradict with the first purpose of the current research (explore), as the current research uses flexible design. That is, during the empirical study, the basic, analytical conceptual framework will be further developed, specified, or even modified or replaced by a more appropriate one to fit the data being revealed.

Two main points have been discussed under the research approach: the use of flexible design; and the development of a proposed, analytical conceptual framework before approaching the empirical investigation. There are, however, another two points that need to be mentioned: the first discusses the theoretical tool used when developing the analytical framework (Theory Construction as Disciplined Imagination); and the second seeks to clarify the misunderstanding associated with the development of theoretical constructs (Theoretical Concepts as Constructs and The Conceptual Meaning of Multidimensional Constructs).

6.2.2 Theory Construction as Disciplined Imagination

Despite the advantages of developing analytical, explanatory conceptual frameworks, developing these frameworks before approaching the empirical investigation “takes time and can be difficult” (Yin, 2009: 36). It takes time to do the necessary delving into what is often quite difficult literature”. It also can be difficult when the research “topic is novel and appropriate theories elusive” (Robson, 2011: 66). In this respect, due to the lack of longitudinal research sought to examine the key capabilities and competences of radical innovation success in both the industrial and service contexts, the development of the analytical framework had been a very difficult undertaking, especially that capabilities and competences are tacit, higher-order concepts manifested by a large set of lower-order latent factors, and that the conceptual framework covers a long chain of
causality. Thought trails or theory construction as disciplined imagination is strongly suggested when scholars seek to propose an explanatory theoretical framework, solving the research problem (Joep, 2006; Langley, 1999; Maxwell, 2008; Weick, 1989). Here, I find that following theory construction as disciplined imagination suggested by Weick (1989) is very useful in this regard.

Weick (1989: 516) argues that the process of knowledge building is an evolutionary sequence that involves trials in the form of conjectures and errors in the form of refutations. Thus, theorizing is not a mechanistic process like conventional linear descriptions of problem solving in which theorizing is dominated by the question: Does the conjecture solve the problem? He suggests what he calls the process of “disciplined imagination”. In this process, theorists design, conduct, and interpret imaginary experiments. When doing so, their activities resemble the three process of evolution: variation; selection, and retention. Because the theorists rather than the nature intentionally guide the evolutionary process, theorizing is more like artificial selection than natural selection.

Weick (1989: 523-528) suggests two tools when undertaking these imaginary experiments: making heterogeneous thought trails; and applying artificial selection criteria (test). In the heterogeneous thought trails, theorists seek solutions, explanations, or conjectures by elaborating on counter schools of thought (e.g., the RVB and CBV as shown in table 4.5). Strong classification schemes are important in this case as they insure the independence of though trails and as such the construction of a good theory. In the artificial selection criteria, the conjectures should satisfy a set of diverse selection criteria that should be applied consistently on all the conjectures. This reflects the self-conscious manipulation which is considered the hallmark of theory construction. The only place where those ideas may be tested adequately would be in the imagined worlds of mental experiments, or computer simulations. In this respect, 6 selection criteria are suggested. The first is “that is interesting”, e.g., a solution that disconfirm an assumption or challenge the theorist’s prior experience and requires new theoretical knowledge and learning. Here, disconfirmation does not annoy generalist theorists as they can develop alternative solutions. The second is “that is obvious”, the reaction that is obvious is often the occasion to drop a conjecture from further consideration. However, this reaction may be a clue to significance as well as a clue to triviality. Furthermore, what is obvious to one person clearly may be novel to someone else.
Thus, the reaction that is obvious may trigger the question: For whom might this not be obvious? The third is “that is connected”, e.g., two complementary dimensions making up a higher order construct. The fourth is “that is believable”, e.g., complete a missing element in a story, like intervening variables. The fifth is “that is beautiful”, beauty and elegant as an aesthetic criterion in selecting conjecture. The sixth is “that is real”, invoking a combination of experience, practice, and convention to select among conjectures.

I had followed the two tools of heterogeneous thought trails and artificial selection criteria suggested by Weick (1989) when proposing an analytical, explanatory conceptual framework before approaching the empirical investigation. I had developed many versions of the analytical conceptual framework. I started by elaborating on the RBV, and I had been able to develop a static model (very similar to the work of Menor and Roth (2008: 270), though with different constructs). When elaborating on the major principles of the CBV, I had been able to gradually move from the static conceptualization to the evolutionary (dynamic or multi-layer) conceptualization presented in Chapter 5. I had also been able to move from the positivist stance to the constructionist stance.

### 6.2.3 Theoretical Concepts as Constructs

There are three types of theoretical constructs: (1) “unidimensional construct”, which refers to a single theoretical concept; (2) “multiple dimensions”, which are regarded as distinct but related theoretical concepts rather than a single overall concept; and (3) “multidimensional construct” (MDC), which refers to a construct that exists in multidimensional domains and, as such, it consists of a number of interrelated attributes or dimensions. In the multidimensional case, a set of dimensions is conceptualized under an overall abstraction, a single overall concept (Edwards, 2001: 144; Law, et al., 1998).

The utility of MDCs has generated considerable debate in management studies (e.g., OB). Critics of the MDCs argue that both the theoretical and empirical utilities of the MDC models are inferior to multiple dimensions (multivariate structural models) that conceptualize these dimensions as a set. On the level of theoretical utility, they argue that the superordinate MDC conceals meaningful differences in effects of dimensions.
(e.g., capabilities). In addition, they argue that the MDC is conceptually ambiguous. On the level of empirical utility, they argue that superordinate MDC distorts effects of dimensions on outcomes, inferior construct validity. They also argue that the MDC explains much less variance than their dimensions as set, inferior criterion validity. Therefore, a MDC is better represented as a set of related dimensions than as a single latent construct. Proponents of MDCs, on the other hand, argue that such constructs are more theoretically useful than their theoretically sterile counterparts. They argue that these MDCs provide complete understanding of broad and complex phenomena. That is because these MDCs are more basic than specific dimensions, and, as such, they are more useful for theory development (Edwards, 2001). Therefore, “it is theoretically meaningful and parsimonious to use . . . overall abstraction as a representation of the dimensions” (Law, et al., 1998: 741).

Despite the extensive use of multiple dimensions (rather than MDCs), two points should be mentioned. First, the debate between critics and advocates of MDCs reflects “ideological differences regarding the value of theories that are broad versus specific” (Edwards, 2001: 149). Second, “the conceptualization of constructs should be theory-driven” (Law and Wong, 1999: 156). Being theory-driven, capabilities and competences are suggested to be conceptualized as theoretical constructs (Madhavaram and Hunt, 2008).

**The Conceptual Meaning of Multidimensional Constructs (MDCs)**

The relations between a MDC and its dimensions should be clearly specified. Without specifying these relations, the various dimensions are simply a collection of related variables, and there is no need to label them as components of a MDC. In other words, a MDC that does not specify the relation with its dimensions is “not a well developed” construct (Law and Wong, 1999; Law, et al., 1998). In this regard, there are several types of MDCs. Of particular importance here are: (1) the superordinate MDC; and (2) the aggregate MDC. Figure 6.1 presents a comparison between these two types.
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Figure 6.1: Differences between the Superordinate MDC and Aggregate MDC

<table>
<thead>
<tr>
<th>Latent (superordinate) MDC (Factor View)</th>
<th>Aggregate MDC (Composite View)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The MDC exists at deeper level than its dimensions. In other words, the single overall construct is the latent commonality underlying the dimensions.</td>
<td>The MDC is formed as algebraic composite of its dimensions. In other words, the single overall construct is the mathematical composite formed from the dimensions.</td>
</tr>
<tr>
<td>This implies that the conceptual meaning of a MDC classified as superordinate is totally different from one classified as aggregate. This has significant consequences not only on the theoretical level, but also at the operationalization level.</td>
<td></td>
</tr>
<tr>
<td>The variance partitioning perspective will be used to explicate the difference. Three types of observed variances of a dimension are shown below. These are: common variance (area 1); group variance (e.g., area 2); and specific variance (e.g., area 3).</td>
<td></td>
</tr>
<tr>
<td>In this respect, the MDC is the superordinate (latent higher-order) construct underlying its dimensions. Therefore, only common variance or covariance shared by all of all dimensions (area 1) is considered as the true variance of the MDC. Other variances are treated as error variance. As such, all the dimensions have to be correlated (interconnectedness).</td>
<td>In this respect, the MDC is the simple sum of its dimensions. Therefore, all specific and group areas, in addition to the common area, are considered as the true variance of the MDC.</td>
</tr>
<tr>
<td>For example, general mental ability, in the area of selection testing, is defined as the general latent construct underlying different ability dimensions: verbal; quantitative; reasoning; and associative.</td>
<td>For example, overall job satisfaction is defined as the sum of such dimensions as satisfaction with: work; coworkers; supervisors; promotion; and pay. This MDC exists only as the summated aggregate of these five dimensions.</td>
</tr>
<tr>
<td>Dimensions are labeled effect indicators of the MDC.</td>
<td>Dimensions are labeled causal indicators of the MDC.</td>
</tr>
<tr>
<td>As the MDC does not exist at the same level as its dimensions, direction of causality is from the MDC (second-order factor) to its dimensions (first-order factors). In other words, the dimensions of the MDC are analogous to reflective measures (reflected in or manifested by).</td>
<td>As the MDC exists at the same level as its dimensions, direction of causality is from dimensions to the MDC. In other words, the dimensions of the MDC are analogous to formative measures.</td>
</tr>
</tbody>
</table>


Based on the previous comparison, the entrepreneurial capability, the direction capability, the incubation capability, and the acceleration capability are conceptualized as theoretical (higher-order) constructs. Furthermore, due to the complementarity attribute, Core Radical Innovation Competence (Core RIC) is conceptualized as a superordinate theoretical (higher-order) construct manifested by five lower-order
dimensions. These are: R&D capability; IT capability; cooperative (networking) capability; managerial systems; and innovation-friendly culture.

6.3 The Research Strategy

Several flexible design research strategies could be used when investigating the research problem, including case study and grounded theory. It should be noted that there is no research strategy that is inherently superior or inferior to any other. Also, research strategies are not thought of as mutually exclusive as more than one strategy may be employed in the same study (Robson, 2011; Saunders, et al., 2009). As mentioned previously, case study was used as the sole flexible design research strategy. Yin (2009: 18) defines case study as “an empirical inquiry that: (1) investigates a contemporary phenomenon in depth and within its real-life context, especially when (2) the boundaries between the phenomenon and context are not clearly evident”. In other words, the case study researcher seeks to accumulate in-depth understanding about not only a real-life phenomenon, but also important contextual conditions that are highly pertinent to the phenomenon itself.

6.3.1 Why Case Study Research

There are six main reasons for using the case study strategy: (1) I need to answer ‘how’ question before being able to conclude and provide an answer for ‘what’ question (how the strategic managers build Core RIC before being able to conclude the factors underlying the resource building capability); (2) I need to benefit from the prior development of theoretical propositions to guide data collection and analysis; (3) I need to gain rich understanding about the context, like culture; (4) I need to gain rich understanding about the processes enacted as the innovation journey and competitive situation unfold; (5) I need to collect data regarding many relevant elements (first-order latent factors), as shown in the conceptual framework, as radical innovation is one of the most complex organizational practices; and (6) I need to collect data via a range of data collection techniques. These six reasons are mentioned as justification for using the case study strategy by many scholars (e.g., Robson, 2011: 79; Saunders, et al., 2009: 145-147; Yin, 2009: 18). In short, the case study strategy is consistent with the extent of existing knowledge about the subject. It also has considerable ability to generate answers to my research questions, and meet my research objective. As the objective of the current research project is to explore and explain, the case study will be
exploratory/explanatory case study. Having presented the justification for using the case study strategy, I will discuss several important aspects related to the case study design. These are: single- and multiple-case design; the case study protocol; flexible design; and the pilot study.

### 6.3.2 Single- and Multiple-case Design

Yin (2009) develops a typology for case study designs based on the type of case study (single/multiple), and the unit of analysis (unitary/multiple). This produces four different designs of case studies: single-case (holistic) design; single-case (embedded) design; multiple-case (holistic) design; and multiple-case (embedded) design. Regarding the single/multiple variants, Yin (2009: 60-61) argues that doing multiple-case study (even “two-case study”) is better than single-case study. This does not only enable the case study researcher to substantially benefit the analytic side of the research, but also reduce the risk resulting from putting “all your eggs in one basket”.

Before approaching the empirical world, there were four issues kept in my mind. The first three issues seemed to contradict the last one. It was believed that commercial banks would be more conservative in doing case study research due to the in-depth nature of this research (and taking into consideration data protection and the complexity of the conceptual framework). A second issue was the nature of the study itself. Radical innovation is not on the agenda of most commercial banks (e.g., Morris and Westbrook, 1996). A third issue was the 2008 financial crisis, and its negative impact on the financial performance of these institutions. These three issues might call for a single-case design. The final issue is the heterogeneous nature of firm capabilities and competence. The more the cases involved will be, the quality of the conceptualization would be. Thus, the final issue called for a multiple-case design. Nevertheless, it was decided to undertake multiple-case studies. It was my intention to select two radical innovations: one followed service professional trajectory, and the other followed technological trajectory. As shown in Section 4.1.2.3, these two innovation trajectories are dominating the innovation activity within the financial service industry.

### 6.3.3 The Development of Case Study Protocol

As suggested by Yin (2009), the case study protocol is a major way of increasing the reliability of the case study research. Thus before conducting the pilot case study, I
prepared a case study protocol to guide the data collection. The protocol was prepared in the English language and only the *case study questions* were translated into the Arabic Language (back translation). The interview protocol, initially drafted in English, was translated into Arabic using conventional back translation. Following the suggestions of Saunders *et al.* (2009: 383-385), the process involved translating the source protocol to target protocol to source protocol by two translators: a bilingual native of the target country (Egypt) to translate the protocol into the Arabic language; a bilingual native speaker of the source language to translate it back into English. The original and back translated versions were compared for differences and comparability. Moreover, following the suggestion of Yin (2009), the case study questions were tested during the pilot study. Such a pre-test was important to insure the quality and accuracy of the final version (e.g., clarifying and rewording the questions). As stated by Douglas and Craig (2007), pretesting is particularly useful for overcoming many of the problems associating the back translation technique. (Please note that the English and Arabic versions of the case study questions are attached, Appendices A.4 and A.5.)

The protocol included three sections as suggested by Yin (2009). These are:

- **Overview:** this section included an introductory letter (information about the scholarship; the sponsor; the researcher; and the purpose of the research; the research ethics with regard to *anonymity, confidentiality, privacy; no harm; and non-deception*; and the informed consent); official permissions obtained; a summary for the main theories adopted (e.g., the resource-based views, the nature of strategic resources, the characteristic-based approach; the General Theory of Competition); some of the influential references used; and the conceptual framework suggested. The purpose of the overview section is three-fold: (1) to enable the decision makers (e.g., executives) and the interviewees in general to make an informed decision regarding the participation in the empirical study; (2) to show that the research is undertaken with the highest ethical standard; (3) to obtain a formal approval for my empirical research plan.

- **Field Procedures:** this section included the contact information of key informants; a schedule for interviews to be made and sites to be visited; maps for these sites, a map for the Greater Cairo Region (GCR), the main place at which the field study is undertaken; and a map and the contact information of the hotels
expected to be used; and the contact information for colleagues and relatives called for assistance and guidance.

-Case study questions: this section implied the translation of the conceptual framework into questions either to be answered by the interviewees, or to be answered by the researcher himself through other methods (e.g., documents, observations). The latter category was useful in reducing the need for making a return visit to some places. Please note that I followed the suggestions provided by Robson (2002) when preparing the case study questions. Each capability was represented by a topic heading. Each heading included: (1) few questions; (2) several prompts; and (3) one probe (anything more?) to expand on the response of each question. Other forms of probes were also used but not written (e.g., Could you go over that again?). The final number of questions, prompts, and written probes was more than 130.

6.3.4 Flexible Design

As Yin (2009) suggests, when there is a high degree of uncertainty with regard to the case study design, the researcher should follow a flexible design. The situation revealed at the initial data collection (pilot study) would enable the researcher to make more informed decision in this regard. Thus, the design of the case study was flexible, including the number of cases, the unit of analysis, and the case study questions. Regarding the number of cases, the flexible design was essential as there was no unique case (or cases) whose identity had been known from the outset of the enquiry. Regarding the case study questions, as the study has an exploratory nature, the case study questions could be generally described as evolving.

6.3.5 The Pilot Study

Following Yin (2009)’s suggestion, the pilot study was used to improve the case study protocol as they had provided considerable insight into the basic issues being studied. Thus, the pilot study was not conceived just as a pretest for the case study questions or case screening. It was an important step toward improving the protocol and the interviewing process in general: clarifying and rewording the questions, detailing the protocol; training the researcher to be more familiar with the interviewing process, and developing personal relationships with some key informants.
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Before the data collection, the researcher prepared a list of all the Egyptian financial institutions, including the 39 commercial banks. While the entire pool of cases was known, there was no known data source enabling the researcher to identify banks introduced radical innovations. Thus, the researcher had asked his sponsor to produce all formal documents (e.g., official permissions) that would facilitate the access to these financial institutions. The researcher received these official permissions before traveling to Egypt.

The researcher travelled to Egypt on 29th May, 2010 to undertake the empirical study. The main **screening criterion** was the introduction of radical innovation product or service (*in the strict and wide sense as shown in Chapter 3*) during the last five years. (Please note that research in NSD usually selects to evaluate innovation projects undertaken during the last three or five years. The longest period was chosen due to the paucity of the Egyptian commercial banks, and the rare nature of radical innovations. Also, this would give me an opportunity to investigate the competitive situation of the totally new product.) Most of the commercial banks were contacted by the researcher. The contact details were downloaded from the CBE. The individuals contacted were the heads of the R&D units, marketing, public relations, and retail banking. Out of the 39 commercial banks, only 8 had shown an interest in discussing the research project. Thus, the total number of banks participated in the pilot study was 8.

Initial interviews (1-2 interviews with informants in each bank) were arranged to briefly discuss: (1) the case study protocol; and the (characteristics and numbers of) innovation projects eligible for inclusion in the empirical research. Regarding the case study questions, the main focus was on the set of general questions (Appendices A.4 and A.5) related to the totally new product/service and the innovation project. As suggested by Yin (2009), the scope of the inquiry for the pilot phase should be much broader and less focused than the ultimate data collection. Table 6.3 presents the list of banks and the number of innovation projects involved in the pilot study.
## Table 6.3: The List of Banks and Number of Innovation Projects Studied

<table>
<thead>
<tr>
<th>No</th>
<th>Code</th>
<th>Ownership (P, P&amp;JV)*</th>
<th>Total Assets (EGP Billion)</th>
<th>No of Employees</th>
<th>No of Branches</th>
<th>Other Modes ***</th>
<th>Radical</th>
<th>Comment</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>P</td>
<td>299</td>
<td>14,600</td>
<td>432</td>
<td>4</td>
<td>1****</td>
<td>Success</td>
<td>Dean</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>P (I)**</td>
<td>13</td>
<td>2,200</td>
<td>43</td>
<td>2</td>
<td>0</td>
<td>Success</td>
<td>Dean</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>P</td>
<td>179</td>
<td>12,316</td>
<td>473</td>
<td>1</td>
<td>0</td>
<td>Success</td>
<td>Myself</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>P&amp;JV</td>
<td>25</td>
<td>2,000</td>
<td>73</td>
<td>1</td>
<td>0</td>
<td>Success</td>
<td>Myself</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>P&amp;JV</td>
<td>71</td>
<td>4,300</td>
<td>154</td>
<td>1</td>
<td>0</td>
<td>Success</td>
<td>Myself</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>P&amp;JV</td>
<td>36</td>
<td>2,397</td>
<td>89</td>
<td>1</td>
<td>0</td>
<td>Failure</td>
<td>Myself</td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>P&amp;JV</td>
<td>53</td>
<td>4,000</td>
<td>137</td>
<td>1</td>
<td>0</td>
<td>Success</td>
<td>Myself</td>
</tr>
<tr>
<td>8</td>
<td>H</td>
<td>P&amp;JV (I)**</td>
<td>10</td>
<td>2,155</td>
<td>70</td>
<td>Imitator (B)</td>
<td>0</td>
<td>Failure</td>
<td>Myself</td>
</tr>
<tr>
<td>9</td>
<td>Z</td>
<td>P&amp;JV</td>
<td>39</td>
<td>3,500</td>
<td>202</td>
<td>Imitator (A)</td>
<td>0</td>
<td>Success</td>
<td>Bank B</td>
</tr>
</tbody>
</table>

Source: Self.

* P: public commercial bank; P&JV: private & joint venture bank. None of the off-shore banks accepted to participate.

** I: Islamic.

*** Incremental and bundling innovations.

**** This radical innovation has not been launched yet.

Out of the 12 projects studied, 11 products were actually launched. Out of these 11 products, there was no radical innovation on the level of the banking industry. Several points, however, should be mentioned.

- While I did not find any radical innovation on the banking level launched during the last 5 years, there was one radical service innovation on the national level. This is the Egyptian National Program for Vehicle Replacement (NPVR). In the entire value chain designed to introduce this product, banks occupy their traditional position, providing vehicle replacement finance. However, the financial product of vehicle replacement finance is incremental innovation. In short, the NPVR is radical on the national level, while the financial product of vehicle finance is incremental on the banking level.

- Despite the lack of radically new product on the banking level, bank A was seen as radical innovator for three reasons. First, the bank had participated in the three stages of the radical innovation (NPVR). In the direction phase, the bank participated by introducing an incremental innovation (the product of financing the conversion of vehicles to be working by compressed natural gas (CNG)). In the incubation phase, the bank had been a key actor in developing the commercial mechanism. In the acceleration phase, the bank introduced the product of vehicle replacement finance. Second, this bank was also the first bank in Egypt to establish a Card Center, ATM technology. Third, the bank is currently involved in another radical innovation project. Though, it has not been launched yet.
Bank A, a key actor in the three phases of the NPVR, did not enjoy first-mover advantages when introducing the product of vehicle replacement finance as another two banks (C and Z) had signed a protocol, in the acceleration phase, with the Egyptian Government to launch their replacement products at the same time. In this respect, the lack of market order entry would not provide the best lap to conceptualize and validate Layer III of the conceptual framework (the success/performance measurement and innovation protection).

The direction phase of the NPVR started more than 5 years ago. Moreover, some interesting incremental innovations were launched by commercial banks more than five years ago.

Gradually and after a series of interviews conducted with key informants in the 8 banks involved in the pilot study, I recognized the necessity to do the following: (1) to relax the selection criteria to suit the current situation (10 years rather than 5 years); and (2) to stratify the empirical investigation based on the three layers of the dynamic conceptual framework (LI, LII, and LIII). Figure 6.4 summarizes the eclectic design devised to cope with the current situation.

<table>
<thead>
<tr>
<th>LI: Core RIC and Entrepreneurial (Resource Building) Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Banks A-H are included in LI.</td>
</tr>
<tr>
<td>- The final criterion that had to be relaxed was the time limit. I decided to include cases introduced new products during the last 10 years rather than the previously identified 5-year period.</td>
</tr>
<tr>
<td>- The unit of analysis will be multiple-case (holistic) design.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LII: The direction-incubation-acceleration capability framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>- All the key actors participated in the direction, incubation, and acceleration phases of the radical innovation project (the NPVR) are included in LII. These are: the EEAA (the idea owner); bank A; the Kfw Entwicklungsbank (the Germany’s leading development bank); the MOF (Ministry of Finance). In the acceleration phase, banks C and Z are included to examine which bank has build a superior acceleration capability. Bank Z is of particular importance. This bank has been conceived as creative imitator, and will significantly contribute to the conceptualization of the acceleration capability.</td>
</tr>
<tr>
<td>- The unit of analysis will be single-case (embedded) design. The single case represents the project, and the embedded design represents the actors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIII: The Success/Performance Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Two competitive situations are chosen: (1) the competitive situation related to the vehicle replacement finance which included Banks A and Z; and (2) the competitive situation related to another financial product (based on technological trajectory) which included bank D (first-mover), and banks E and F (early movers). Involving another competitive situation based on another innovation trajectory was believed to enrich the conceptualization of this layer of conceptual framework.</td>
</tr>
<tr>
<td>- The unit of analysis will be multiple-case (embedded) design. Each competitive situation represents a case, in which several competitors are analyzed.</td>
</tr>
</tbody>
</table>

Source: Self.
This eclectic design is based on what Saunders, *et al.* (2009: 239) call “*purposive* or *judgmental sampling*”, which is often used when working with very small samples such as case study research and when the researcher wish to select “information-rich cases”. The strategy employed when following this technique was “*heterogeneous* or *maximum variation sampling*” in which data collected should enable the researcher to document “uniqueness”. (Two main criteria were used when selecting the cases. **First**, the bank that had a *superior capability* (e.g., R&D) was included, and the way by which this capability had been accumulated was traced. **Second**, the bank that had an *inferior capability* (poor strategic resource), and its decision makers were able to intervene to close the gap was also included.) It was believed that such an eclectic design would enable the researcher not only in answering the research questions, but also in taking into consideration the core of the competence-based view of the firm (heterogeneity of firm resources). Figure 6.2 represents the case study design.

**Figure 6.2: The Case Study Design**

```
<table>
<thead>
<tr>
<th>LI: Core RIC and Entrepreneurial (Resource Building) Capability</th>
<th>Multiple-case (Holistic) Design</th>
<th>Chapter 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>LII: Direction-Incubation-Acceleration Capabilities of Radical Innovation Management</td>
<td>Single-case (Embedded) Design</td>
<td>Chapters 8</td>
</tr>
<tr>
<td>LIII: Success/Performance Measurement</td>
<td>Multiple-case (Embedded) Design</td>
<td>Chapter 9</td>
</tr>
</tbody>
</table>
```

Source: Self.

Two important notes should be made before concluding this section:

- The pilot study enabled the researcher to develop the commonly required skills for case study research identified by Yin (2009). These are: “asking good questions”; “being a good listener”; “exercising adaptiveness and flexibility”; and “having a firm grasp of the issues being studied”. This reflects what Robson (2011: 141) calls “learning on the job”.
- The case study protocol (especially the case study questions) were continued to evolve after the pilot study, covering the period of data collection (and analysis).
6.4 The Research Choice

Saunders, et al. (2009: 151) refer to the way by which data collection techniques and data analysis procedures is combined as the “research choice”. In this respect, they identify three main research choices: “mono method” (the use of a single data collection technique and corresponding data analysis procedures); “multi-method” (the use of more than one data collection technique and corresponding data analysis procedures); and “mixed-methods” (the use of both quantitative and qualitative data collection techniques and corresponding data analysis procedures). Based on the previous classification, the current research is described as **multi-method qualitative study**.

- It is a qualitative study because words (the most common form of qualitative data) rather than numbers are the main focus of the current study. Moreover, it is strongly suggested that building conceptual frameworks should be based on in-depth empirical research. In this context, while quantitative data allows “thin” abstraction or description for the phenomenon, qualitative data allows the “thick” or “through” abstraction or description of this phenomenon (Saunders, et al., 2009: 482). Put it differently, “narrative, accounts, and other collections of words are variously described as ‘rich’, ‘full’, and ‘real’, and contrasted with the thin abstractions of numbers” (Robson, 2011: 465-466). Thus, qualitative data is more relevant taking into consideration the current state of knowledge regarding the studied phenomenon, and the nature of the current work (theory building rather than theory testing).

- It is a multi-method study because three main data collection techniques were used: semi-structured interviews; documentation; and direct observation. Also, a common framework of data analysis procedures was employed. This framework involved two strategies: process narrative strategy (as an organizing device); and synthetic strategy.

6.5 Time Horizon

Saunders, et al. (2009: 155) differentiate between two types of studies: cross-sectional; and longitudinal. The former represents a “snapshot” taken at a particular time while the latter is more akin to “a dairy or a series of snapshots”. Longitudinal research, thus, is “a representation of events over a given period”. The main strength of longitudinal research, like longitudinal case study, is the capacity that it has to study change and development. In this respect, the current research project employs a **longitudinal**
research design. In this type of research, “chronology is a central organizing device”. That is the researcher seeks to document as completely as possible the processes and events as they unfold in reality. This entails collecting longitudinal data, which can be obtained either by observing processes as they occur in real time, or by relying on other data collection techniques (e.g., documents and retrospective interviews) to obtain a retrospective account of the process itself (Langley, 1999; Van de Ven, 2007; Van de Ven and Poole, 2005: 1386). In other words, the current research is a longitudinal case study as it seeks to chronologically document the activities, steps, or events the innovator bank goes through when accumulating the Core RIC required before the initiation of radical innovation project, when developing and implementing the radical innovation, and when establishing and sustaining the competitive advantage as the process of competition unfold. In this respect, the data collected covers the period 2002-2010.

6.6 Data Collection

6.6.1 Data Collection Techniques

Yin (2009) identifies six sources of evidence. These are: interviews; documentation, archival records; direct observation; participant observation; and physical artifact. In the current research, three data collection methods were used. These were: semi-structured interviews; documentation; and direct observation. The following is a detailed discussion for each data collection method.

6.6.1.1 Semi-structured Interviews

Robson (2011) identifies three types of interviews. These are: “fully structured interview” (or standardized interview); semi-structured interview”; and “unstructured interview” (or in-depth interview). Saunders, et al. (2009) state that structured interviews are used to collect quantitative data. Semi-structured and in-depth interviews, on the other hand, are used to collect qualitative data. They also state that the type of interview selected should fit the research purpose. In this respect, semi-structured interviews fit research that seeks to explore and explain.

As shown in the case study questions (the third section in the case study protocol), the proposed conceptual framework was translated into a set of interview questions. Each
construct (e.g., capability or strategic resource) in the analytical conceptual framework (presented in Chapter 5) was used as a topic heading, and was associated by a few questions, several prompts, and one probe (please see the 13 cards shown in Appendix A.4). As suggested by Robson (2011), each card served as a checklist, and additional unplanned questions were asked to follow what the respondent said. This, therefore, enabled the researcher not only to follow the line of inquiry, but also to modify it, following interesting responses. It should be noted, however, that interviewing was the main data collection technique. The main reason was that much of the experience gained from the innovation initiatives was left undocumented. In addition, my request of reviewing many of the internal documents (e.g., the minutes of meeting) was denied.

Regarding the sample size, Saunders, et al. (2009) suggest that, when the sample is drawn from a heterogeneous population and when the research question is wide ranging, the researcher should expect to undertake between 25-30 interviews. Robson (2011) suggest that it is possible that one might achieve data saturation after 35 interviews. In this respect, the number of respondents/informants interviewed was 40. Interviews took place over an extended period of time (sessions). The number of formal sessions, excluding the informal talks, ranged greatly (from 2-9 sessions), depending on the knowledge and experience of the respondent/informant and the availability of these participants. Thus, the number of interview sessions undertaken exceeded the minimum identified above.

The session time ranged approximately from 60-90 minutes. Furthermore, all the interviews undertaken during the two academic missions were one-to-one, face-to-face interviews. Also, most of these sessions took place in the workplace. While I was away from my home country, I was not able to conduct face-to-face interviews. Thus, the interviewing process had been continued using other ways. Some participants preferred telephone interviews, others preferred online interviews (using Skype and Google Chat), while the other preferred off-line interviews (email interviews). Saunders, et al. (2009: 349-351) state that most of the disadvantages of telephone, online, and off-line interviews would be eliminated (or mitigated) if the initial wave of interviews undertaken was face-to-face interviews. This was the case in the current research. This type of semi-structure (informal) interview, however, has a set of weaknesses. Table 6.5 lists the major weaknesses and the solutions implemented to mitigate them.
Table 6.5: Weaknesses of Semi-structured Interviews and Solutions Implemented

<table>
<thead>
<tr>
<th>Weaknesses of semi-structured interviews</th>
<th>Solutions implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need to demonstrate credibility: increase the level of confidence in the researcher trustworthiness.</td>
<td>-The pilot study enables the researcher to accumulate skills related to the interviewing process. -Discussing the overview section of the case study protocol in the first interview with each key informant. -Being knowledgeable about the research topic, the case (e.g., bank), and situational context. -Leaving potentially sensitive questions (e.g., reasons of failure) until near the end of the interview sessions.</td>
</tr>
<tr>
<td>Interviewee (response) bias due to:</td>
<td>-Back translation, and participant review. -The use of open questions with associated probes. -Showing neutral (but not an uninterested) response. -Information is obtained from more than one interviewee (possibly from different organizational levels). Conducting one-to-one interview (rather than group interview).</td>
</tr>
<tr>
<td>Interviewer bias due to incomplete interpretation.</td>
<td>-Testing the researcher understanding by summarizing the explanation provided by the interviewee.</td>
</tr>
<tr>
<td>Inaccuracies due to:</td>
<td>-Using audio-tape recorder. Taking notes during or directly after the interview. -Providing a list of themes (cards) to be discussed before the interview to allow interviewees to prepare themselves and assemble supporting organizational documentation from their files. -The use of metaphors and diagrams to simplify the discussion*.</td>
</tr>
<tr>
<td>-Poor recall on the part of the interviewer.</td>
<td>-Complexity of the phenomena (radical innovation related capabilities and competences which are tacit).</td>
</tr>
<tr>
<td>-Poor recall on the part of interviewee.</td>
<td></td>
</tr>
<tr>
<td>Sampling appropriateness.</td>
<td>-Interviewing good informants who have experienced the events, actions, and processes; who know the necessary information; and how can articulate and be reflective. -Using snowball sampling when identifying these key informants**.</td>
</tr>
<tr>
<td>Sampling adequacy</td>
<td>-Enough data about the processes. Contradictions are resolved, issues are covered, and additional data collected provides few, if any, new insights (data or theoretical saturation).</td>
</tr>
<tr>
<td>Sampling for scope and variation</td>
<td>-Participants had different organizational positions (e.g., corporate seniors, senior managers, middle managers, and team members). -The participant banks have different ownership type (public, private, and joint venture), and different sizes (huge, large, medium, and small). -Some key governmental actors participated in the radical innovation were involved.</td>
</tr>
</tbody>
</table>


** Snowball sampling was seen as the best sampling strategy as it was difficult to identify members of the desired population (Saunders, et al., 2009).

**Taxi Owner/Driver Experience**

While conducting the pilot study, the manager of GDT at bank A advised the researcher to undertake a customer survey with taxi owners and drivers to ask about their
perception towards the four competitive banks launched the product of vehicle replacement finance, mainly in terms of service quality and speed. It was a valuable advice. Though, the researcher decided to ask about the quality of the NPVR enabling him to understand the initiative from another point of view. Thus, the white taxi (the outcome of the NPVR) had been used as the main method of transportation. It should be stressed, however, that this was not a customer survey.

Convenience sampling was used in this regard. As stated by Saunders, et al. (2009: 241), it involves selecting “haphazardly” those cases (taxi owners/drivers) that are easier to obtain for the sample. In this sampling technique, however, the likelihood of sample being representative is “very low”, meaning that “subsequent generalizations are likely to be at best flawed”. In the current research, this sampling technique was chosen because its relative cost was low. Also, no generalization was thought. As suggested by Yin (2009), it is another source of evidence used to corroborate the findings related to the management of radical innovation project.

During the first mission (May 2010 – September 2010), and the second one (June 2011), 136 trips, in the Cairo and Giza governorates, had been made using the white taxi. The questions were general and emphasized on: (1) the replacement idea itself; and (2) the quality of the replacement initiative, or more precisely the issues confronting these activity implementers. To avoid any danger from making interviews while driving, the researcher asked the taxi owner/drivers to park on the roadside to make a short (time-related paid) interview. The researcher was not able to or successful in conducting interviews with 73 taxi owners/drivers for several reasons (new to the taxi business and does not have experience; not interested in discussion; tired; hesitate to share his experience; insisted to talk while driving; or did not provide convincing comments). 63 taxi owners/drivers had agreed to share their experience. The interviews ranged between 15-25 minutes, and were unrecorded. Thus, taking notes was the main method.

6.6.1.2 Documentation

Documentary data are available in written forms such as minutes of meeting, proposals, progress reports, formal studies or evaluations of the same case (the NPVR), transcripts of speeches, daily news papers and online news websites, and banks and governmental agencies websites. Documentary data also include non-written forms such as video
recording, pictures, and TV programs. Documents are used most frequently as a part of case study research. They can be used for triangulation purposes, or to provide something of a longitudinal dimension to a study when sequence of documents is available extending back in time (Robson, 2011; Saunders, et al., 2009; Van de Ven and Poole, 2005; Yin, 2009). Documents, thus, were a main way followed to create the longitudinal data set stored in the case study database. Some of these documents were published, while others were internal documents. While documents are considered as a valuable data collection technique for case study research, in general, and longitudinal studies, in particular, they have some disadvantage. Table 6.6 shows the most cited criticisms of this data collection technique and how the researcher managed to overcome them.

<table>
<thead>
<tr>
<th>Weaknesses of documentation</th>
<th>Solutions implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrievability: can be difficult to locate.</td>
<td>Using search engines and websites, and seeking the help of experts, key informants, and colleagues.</td>
</tr>
<tr>
<td>Accessibility: access may be deliberately withheld</td>
<td>Negotiating with the decision makers, and requesting access from gatekeepers for internal documents.</td>
</tr>
<tr>
<td>Suitability: written for specific purpose, and some specific audience other than those of the case study being done.</td>
<td>Assessing suitability, looking for alternative secondary source, or collecting primary data (e.g., through interviews).</td>
</tr>
<tr>
<td>Bias: reflects (unknown) bias of the author.</td>
<td>Assessing the reputation of the source and selecting high quality sources.</td>
</tr>
<tr>
<td></td>
<td>Being critical in interpreting the content and context of the document.</td>
</tr>
<tr>
<td></td>
<td>Collecting documents from more than one source (independent sources whatever possible, known as cross-check verification), and looking for contradictions.</td>
</tr>
</tbody>
</table>

Source: Compiled from Saunders, et al. (2009) and Yin (2009).

It should be noted that gaining access to documents was accepted only by three participant banks. But, it was essential to review some documents (e.g., minutes of meeting and project memos) to corroborate findings and/or resolve contradictions. In this case, the interviewee accepted to review himself (or herself) the internal documents, and inform the researcher to be able to corroborate or contradict the evidence. Regarding the NPVR, the researcher was able to collect all the pertinent documents form national and international actors involved.

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2 Regarding the NPVR, event shows and TV programs appearing in the mass media were also downloaded and analyzed. The Minister of Finance and his deputy (who were responsible for the NPVR in the acceleration phase) were the guest of the most famous TV talk show in Egypt (Masr ElNahrda: http://www.masrelnahrdna.net) produced by the Egyptian Radio & Television Union. After the Egyptian Revolution, the webpage of the talk show was suspended. Thus, the talk show’s channel on YouTube (http://www.youtube.com/user/MasrElNahrdaEG) was followed.
6.6.1.3 Direct Observation

Although direct observation is considered as one valuable source of evidence (Yin, 2009), the researcher was able to collect very limited amount of data using this source, as the main part of the phenomenon was purely historical (retrospective). Nevertheless, the researcher was able to use this source to collect some additional data with regard to the last phase of the NPVR (acceleration), specifically the service encounters and servicescape of banks A and Z. Though, the researcher was not able to get photos or videos as evidence.

Case Study Notes or Memos (Analytical Aid)

Following the recommendations of Yin (2009), Saunders, et al. (2009), and Robson (2011), during the interviews, the review of documentary, and the collection of observational evidence, notes were taken and recorded in a diary, and reviewed in a daily basis. Also, any new idea with regard to any aspect of the research was recorded in this diary.

6.6.2 Data Collection Period

Data collection had continued for 12 months (June 2010-July 2011). During this period two academic missions had been made to Egypt: 29th May 2010-10th September 2010; and 2nd June 2011-21st June 2011. Between these two academic missions and after the second one, telephone and internet-mediated interviews had been conducted.

6.6.3 Ethical Considerations

Research ethics are not only concerned with the empirical study, but also the research in general. They involve consideration of right and wrong (Remenyi, 1998). The ethical issues of the research “arise when we try to decide between one course of action and another not in terms of expediency or efficiency but by reference to standard of what is morally right or wrong” (Barnes, 1979). In this respect, a number of professional bodies have emphasized the importance of conducting social research in accordance with the ethical principles. These principles help in managing the ethical issues that may exist at different levels such as relations with and responsibilities towards research participants (dignity, informed consent, no harm to participants, not to deceive participants, anonymity, privacy, and confidentiality) (BSA, 2004). In practice, however, there might be a conflict between some ethical principles which create ethical dilemmas. In this
respect, “ethical guidelines produced by professional bodies offer little advice on how to deal with these ethical dilemmas”. Therefore, to manage these dilemmas, a number of approaches have been introduced in the literature—the expedient, the value-driven, and the pragmatic. The **value-driven approach**, adopted in the current research, has two complementary strategies. The first strategy is concerned with following procedures and guidelines have been mentioned in the relevant ethical codes and statements. However, in case of the dilemmas, the researcher should develop his/her own ethical code and value. In addition, it might be useful to consult relevant academic staff (Gallagher *et al.*, 1995: 296-297). In this respect, it is important to discuss two ethical issues appeared when obtaining a formal approval for my empirical research plan: one related to the individuals; and the other related to the participating cases (banks).

**Ethical Issues Regarding the Individuals**

Seven ethical issues need to be mentioned. *First*, semi-structured interviews imply unstructured interactions that might not be found in other methods, like closed-ended questionnaires (Robson, 2011). Here, the *value-driven approach* discussed in the footnote was followed. *Second*, some interviewees, in different organizational levels, did not give the researcher a permission to record the interview using an audiotape, and others seemed uncomfortable in its presence. In these cases, the recording device was not used during the interviews, and many notes had to be taken. *Third*, all the informants, whatever the organizational level, asked the researcher not to use real names. However, they found no problem in mentioning the organizational position (senior, middle, or team member) and profession (e.g., development, marketing, IT). Thus, the real names were disguised. *Fourth*, none of the informants, whatever the organizational level, allowed the researcher to append the raw data (the interview scripts). *Fifth*, the researcher was asked not to attach the number of interviews conducted in the interview descriptive coding. *Sixth*, many of the taxi owners/drivers accepted to participate, but did not accept to park on the roadside to conduct a short (paid) interview. Making interviews while driving, however, may distract the interviewee and may cause harm for the driver and passenger. Thus, to avoid any danger, the researcher rejected to undertake the interview. *Finally*, some of the documentary evidence was taken from daily news papers, online news websites, and governmental agencies’ websites. Here, the real names of officials (e.g., the Minister of Finance and his deputy) were used in the title of these documents. These real names will
be disguised both in the text and in the *reference* list. Their official positions will be used instead.

**Ethical Issues Regarding the Organizations**

Three ethical issues need to be mentioned. *First*, none of the commercial banks accepted to append (or even cite) the internal documentary evidence, unless the document has a public nature. *Second*, Banks A and Z rejected to take photos while collecting the observational evidence. *Third*, all the participating banks (*except bank A*) did not allow the researcher to reveal the real names of the organization. This, however, would make the mechanics of composing the case very difficult. It would also imply the elimination of some important background information about the cases (Yin, 2009). The number of the Egyptian commercial banks is not many. In addition, the case studies involved the participation of first-movers, in addition to early movers. Both, in fact, are few as shown in the pilot study. Thus, the researcher had to negotiate with the decision makers. Finally, these decision makers had agreed to just use fictitious names for their organizations.

**6.7 Data Analysis and Interpretation**

**6.7.1 Data analysis Facilitated by Standard Software**

There are three qualitative data analysis methods. These are: (1) specialist qualitative data analysis software (e.g., NVivo, and ATLAS.ti); (2) manual data analysis facilitated by standard software (e.g., simple word processing package); and (3) manual data analysis (paper-based approach). While the capabilities of specialist packages are of great help and can enhance the analysis process, the researcher preferred to use the second choice for several reasons, despite it was difficult undertaking. *First*, it enables the researcher to be more familiar with the data, and to penetrate the analysis process to develop more understanding about the phenomenon within its real context. *Second*, developing a proficiency in the use of specialist packages takes time and effort. In this respect, the researcher has been able to accumulate sufficient skills in the use of word processor as it has been used by the researcher for more than 10 years. *Third*, the word processor can also perform several essential functions related to qualitative data analysis (e.g., *coding* through copy and paste; and *data reduction* though marking, extracting, and putting together selected data to form a longer text). *Fourth*, it enables
the researcher to accumulate new knowledge and skills related to qualitative data analysis and interpretation, learning-on-the job (Robson, 2011; Saunders, et al., 2009). In this respect, Robson (2011: 472) states that the capabilities of these specialist software “must not be overestimated, since computers are still unable to perform an independent rational process or substitute the analyst’s capacities”.

6.7.2 Qualitative Data Analysis Procedures

Langley (1999: 704) recognizes the messy nature of process data, and the constant challenge facing researchers when making sense of them. She offers an insightful guide to approaches to building theories from process data based on an in-depth reading of organizational studies and methods literature, and also based on her own research experience. She offers “seven strategies for sensemaking”. Then, she explores the potential for combinations of sensemaking strategies to offer several common frameworks. One common framework proposed is a combination of “narrative strategy” and “synthetic strategy”.

The narrative strategy is used as an organizing strategy. Narrative involves “construction of a detailed story from the raw data”. In the current research, narrative is used as a way of “descriptively representing process data in a systematic organized form”. As such, it constitutes the “initial” rather than final step in the sensemaking process. Thus, it serves as an “intermediary” database for the identification of “constructs” (“synthetic strategy”), and the formulation of propositions linking these constructs. In other words, the narrative strategy is closer to the raw data than the synthetic strategy (Langley, 1999: 704). In this sense, the researcher will be able to answer the how questions (Van de Ven, 2007; Van de Ven and Poole, 2005), e.g., how strategic managers build the R&D and IT capabilities. But, the how question is not the only research question sought to be answered, hence the need to follow a second sensemaking strategy (synthetic strategy). The synthetic strategy is used to create the concepts. Thus, the “original process data” produced by the narrative strategy are “transformed from stories composed of ‘events’ to concepts that synthesize their critical components (Langley, 1999: 704). Thus, the synthetic strategy is used to develop “categories of concepts” that answer what questions (Van de Ven, 1992, 2007; Van de Ven and Poole, 2005), the final outcome of the current thesis.
Langley (1999), however, did not provide comprehensive procedures to implement this common framework. Moreover, her common framework of data analysis enables researchers to develop first-order constructs, not theoretical (higher-order) constructs. Furthermore, she does not show how the pre-developed conceptual framework could serve the analysis process. Thus, this section is intended to elaborate and extend the common framework of process narrative and synthetic strategies. Table 6.7 lists the main data analysis procedures implemented. The following is a documentation of these data analysis procedures. It should be noted, however, that while these steps will be represented sequentially, there were, in fact, *interrelated and interactive*.

**Table 6.7: A Common Framework of Data Analysis (Narrative and Synthetic)**

<table>
<thead>
<tr>
<th>First-level Analysis: Narrative Strategy</th>
<th>Second-level Analysis: Synthetic Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Initial Data Analysis</td>
<td>5- Synthetic (coding, factoring, portioning, unitizing)</td>
</tr>
<tr>
<td>2- Data Preparation</td>
<td></td>
</tr>
<tr>
<td>3- Data Summarizing (Reduction)</td>
<td></td>
</tr>
<tr>
<td>4- Narrative</td>
<td></td>
</tr>
</tbody>
</table>

Source: Self.

1- **Initial Data Analysis**

Data had been collected based on the predetermined codes. Raw data collected through interviews and documents represented activities, processes, tasks, decisions, events, etc. Here, documents were not only used for triangulation purpose, but also to serve the longitudinal nature of the study through the collection of a sequence of documents extending back in time (Robson, 2011; Saunders, *et al.*, 2009; Yin, 2009). Hence, I started to build the case study database, and undertake the initial data analysis.

The initial analysis was undertaken following the suggestions of Saunders, *et al.* (2009) and Robson (2002). In each day, the researcher listened to the interviews conducted. Also, the documents collected were skimmed, and the notes taken were consulted. The goal was to develop general statements (summaries and abstracts), and link them to the predefined codes in the current conceptual framework. Thus, the predefined codes in this framework had become more crystallized and detailed. These summaries and abstracts reflected the initial attempts for reducing data. Whenever new general statements did not belong to the current coding scheme, they were targeted through a new list of questions and associated prompts. The incubation capability is a case in point. The relevant literature was consulted in this regard. As soon as the researcher believed that the new code was valid, and represent “important discovery” (in the
terminology of Yin (2009: 56)), the conceptual framework was updated. This reflected the informal, continuous, initial data summarizing and analysis followed during the data collection. In addition, as the set of initial questions and their prompts in the interview schedule were crystallized, it was updated. Thus, several versions of the case study protocol had been developed and reprinted. By the end of the first academic mission, new conceptual framework with more crystallized, detailed codes was developed. This framework was used to guide the subsequent steps in the data collection and analysis.

2- Data Preparation

After finishing the first academic mission, all the audio-recorded interviews had been downloaded via USB to my PC (several backups were made on USBs, DVDs, and mass storage device), and coded (descriptive coding: interview session number, date, place, profession, position, and organization). These interviews were converted to word-processed text (MS Office 2007) file by the researcher. VLC media player was used to control (slow) the speed. The transcription took into consideration not only the exact words, but also the tone in which these words were said. At first, all the sections in the first audio-recordings were transcribed. Later, only the sections pertinent to my research were transcribed (data sampling), without having a negative impact on the exploration element which was an ongoing process. The hand-written interviews and case study notes (recorded in the dairy) were added to the word file (Robson, 2011; Saunders, et al., 2009).

The data was transcribed in Arabic. Questions were put in red font color, answers were put in black font color, and questions emerged during the transcription and/or analysis was put in larger, bold, red font color. The data file was not cleaned by correcting the word and grammar errors, as the tone was important. The transcription process was extremely time-consuming to be undertaken by the researcher. Every recorded hour took between five and ten hours to be transcribed. Though, it was useful to transcribe these interviews myself, as suggested by Robson (2011) and Saunders, et al. (2009), to insure the accuracy (especially tone-based), and to make myself more familiar with the collected data, and recall the context and content of the interviews (in short, to remember the real life setting I was a part of). Other components of the case study database, like printed and electronic versions of documents (web-based reports, and
emailed documents and reports), were also descriptively coded, and appropriately stored (plastic folders for printed documents and subdirectories for electronic ones).

3- Data Summarizing (Reduction)
Guided by the most recent conceptual framework developed by the end of the data collection, the researcher commenced the step of data summarization (condensing or data reduction). The word file and other collected documents were read carefully, and summarized. Summarizing, thus, involved “condensing the meaning of large amounts of text into fewer words” so that the researcher would become more “conversant” with: (1) the predefined codes; (2) new codes emerged from the data collected; and (3) the whole story (the sequence of events). Some of the new codes required further exploration. Thus, the list of questions was updated and follow-up telephone, online and offline interviews were made with the key informants to answer these questions and to ask emailing further electronic documents (Saunders, et al., 2009: 491-492). Regarding the NPVR, it should be mentioned that some significant documents collected from the different key actors frequently provided contradictory data. Thus, the list of questions accumulated considerably after reading the documents. These new (more specific) follow-up interviews and downloaded documents were read carefully and summarized in the same way.

4- Narrative
Summarizing data enabled the researcher to construct narrative (Saunders, et al., 2009). A detailed story was woven from threads of semi-structured interviews and documents merely aimed at preparing chronologies for subsequent analysis. In other words, the events were carefully documented (selected, organized, and connected) to reflect sequence in time. By doing so, the case study can become the initial bases for causal inferences (Langley, 1999; Van de Ven, 1992, 2007; Van de Ven and Poole, 2005; Yin, 2009). Although narrative is not the final product of the current thesis, it will appear in the case study findings to support the causal inference (the development of theoretical propositions). In other words, chronology will not be used as “a descriptive device only” in an attempt to abstract codes, but also “to investigate the presumed causal events”. By doing so, the researcher could be able to strengthen the internal validity of the case study (Yin, 2009: 148).
5- Synthetic

Synthetic represented the second-level analysis. The narrative constructed was transformed from stories composed of “events” to constructs that synthesize their critical components. The aim, thus, was to create categories of concepts (Langley, 1999: 704; Van de Ven, 1992). This step reflects what Saunders, et al. (2009) call data categorizing based on template analysis, and what Robson (2011) calls thematic coding based on template analysis. Table 6.8 summarizes the main steps followed in this step.

<table>
<thead>
<tr>
<th>Table 6.8: The Main Steps of Synthetic Strategy</th>
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<tbody>
<tr>
<td>1. First-order codes (first-order factors) represented labels giving to segments of the narrative. The codes were: “theory-driven”, based on the predefined template; or “data-driven”, derived from the data collected. The codes generated from the data were given labels that: reflected the theoretical idea embedded in the segments; represented the actual terms used by key informants, or mentioned in the documents (Robson, 2011; Saunders, et al., 2009).</td>
</tr>
<tr>
<td>2. As the current research seeks to create theoretical (higher-order) constructs, the researcher will elaborate on the tactic of factoring. Factoring is the qualitative “analogue” of the statistical technique of factor analysis. While first-order codes represent factors, higher-order codes represent general themes (or more precisely capabilities or dimensions). Factoring, thus, represents moving up the abstraction ladder. In this process, the researcher hypothesizes that “some disparate facts or words do something in common or are something in common”. Contrarily to factoring, partitioning was used to “unbundle” codes to still lower-order codes to provide more coherent conceptualization (Miles and Huberman, 1994: 254-257). As shown in a previous section (theoretical concepts as constructs), the process of factoring should be informed by theory.</td>
</tr>
<tr>
<td>3. Data unitizing implied extracting and attaching relevant “bits” or “chunks” of raw data to the appropriate first-order codes resulting from the previous step. These chunks of data were attached by their descriptive coding (in addition to their place in the transcripts, such as page 1, lines 5-8) to the first-order latent factors. Data unitizing, thus, implied reducing and rearranging the data into a more manageable and comprehensible form (Saunders, et al., 2009).</td>
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Source: Self.

Two important points should be mentioned regarding the previous three steps. First, in data unitizing, the bits of chunks of raw data attached to the first-order codes were obtained from multiple cases (as shown in LI and LIII), or from the logical units in the embedded design (as shown in LII). Thus, the findings were aggregated across the multiple cases involved LI and LIII, and across the logical units in the embedded design followed in LII. This represents what Yin (2009) calls cross-case synthesis. Second, as suggested by Robson (2011: 486), an appropriate display technique should be used to present the findings. The main display technique used was causal networks showing the theoretical constructs and the relationships between them (theoretical propositions).

6.8 The Quality Criteria of the Research Design

Qualitative researchers need to be watchful about the multiple sources of analytic bias that can weaken or even invalidate findings. Thus, it is essential to follow and
implement guidelines (tactics) for judging the “goodness” of qualitative research, whether findings were valid and procedures robust (Miles and Huberman, 1994). Based on four tests commonly used to establish the rigor of any empirical social research design (construct validity; internal validity; external validity; and reliability), Yin (2009) suggests a set of tactics, as well as a cross-reference to the phase of research when the tactic is to be used. The researcher will elaborate on these tactics to show the quality criteria of research design implemented on the current research project. While doing so, the researcher will enhance these tactics by explanations provided by Miles and Huberman (1994: 262-277). Table 6.9 lists the 11 tactics implemented.

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</tr>
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<td></td>
<td>Display sufficient evidence</td>
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Table 6.9: The Tactics Implemented to Insure the Rigor of the Case Study Design

6.8.1 Construct Validity

This test aims to establish correct operational measures for the concepts being studied. That is, the tests, instruments, and questions measure the concepts they are intended to measure. In this respect, three main tactics have been implemented to increase the construct validity, as discussed below (Yin, 2009).

6.8.1.1 Using Multiple Sources of Evidence (Triangulation)

As argued by Yin (2009) and Robson (2011), using multiple sources of data collection enhances the construct validity of case study research. That is, during the data collection phase, the researcher should use as many sources of evidence as possible because of
three reasons. First, no single source has a complete advantage over all the others. Second, the use of more than one source enhances the opportunity to address a broader array of issues. Third, the use of more than one source enhances the opportunity to establish converging lines of inquiry.

As shown in data collection section, three data collection techniques were used (semi-structured interviews; documentation; and direct observation). Moreover, it was shown how a detailed story was woven from the threads of these multiple sources when constructing the narrative. Thus, as suggested by Yin (2009), all sources of evidence have been integrated to form a coherent and compelling case study. In other words, all sources of evidence were reviewed and analyzed together, so that the events or facts of the case study have been supported by more than a single source of evidence. On the other hand, Miles and Huberman (1994: 267) extend triangulation to include data source, which can include persons and places. Triangulating data sources had been used during data collection. That is the same activity, process, task, or event had been discussed with more than one key informant. Also documents were collected from more than one source, whatever possible, allowing for cross-check verification. By doing so, the verification process “will largely be built into data collection as you go”.

Triangulation also enabled the researcher to identify what Miles and Huberman (1994: 269) calls outliers. They state that finding and exploring outliers (which may be people or unusual events) can prove the conclusion, deepen it, or highlight the need to change it. For example, the researcher found a high level of enthusiasm among the key informants regarding the success of the NPVR. However, when reviewing some of the independent, high quality daily news papers and online news websites, the researcher noticed an unusual event (the ad crisis which had a negative impact on the taxi owners/drivers). That is why the researcher decided to undertake interviews with the taxi owners/drivers to explore their experience regarding the management of the NPVR. This enabled the researcher to identify a set of weaknesses and threats related to the program, which was reflected in the conceptualization of the lower-order codes of one capability (finalizing the business model).

6.8.1.2 Getting Feedback from Informants

Reviewing the draft case study (not only just by peers, but also by the participant and informants in the case, known as member checks) is considered as a” validation
procedure”, and, thus, enhances the construct validity. This tactic is identified as “a way of corroborating the essential facts and evidence presented in a case report”. Thus, any disagreement in facts must be settled through a search for further evidence (Yin, 2009: 182-183). As suggested by Miles and Huberman (1994: 275-276) the findings were laid out clearly and systematically and presented to some key informants (in banks A and C, and the EEAA) for careful scrutiny and comment. Thus, the higher-order dimensions, and the lower-order codes associated with disguised quotes were reviewed by some key informants. Miles and Huberman also suggest that the verification process should also be built into the data collection process. Thus, when a finding began to take shape, the researcher checked it out with more than one key informant, “confidant”. It should be noted that some of the criticisms, comments, and explanations made be these key informants were invaluable, and had been taken into consideration when producing the final report. The post-analysis findings (in Chapter 8) are cases in point.

6.8.1.3 Establishing a Chain of Evidence

As suggested by Yin (2009), maintaining a chain of evidence enhances the construct validity. In this respect, the initial study questions need to be linked to the theoretical framework, which need to be linked to the case study questions (in the case study protocol), which need to be linked to the actual evidence provided in the case study findings and interpretations, which need to be linked to the ultimate case study conclusion. By doing so, the reader will be able to trace the evidentiary process in either direction (from conclusions back to initial research questions, or from initial research questions to conclusions). This tactic is implemented in table 11.4.

6.8.2 Internal Validity

This test seeks to establish a (real) causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships. This threat concerns “explanatory or causal studies” only and not for descriptive or exploratory studies. Therefore, this test is essential for the current research project which does not only seek to explore, but also to explain (Yin, 2009: 42). In this respect, two main tactics were implemented to strengthen the internal validity. These were: chronology; and addressing rival explanations. Chronology (as shown in step 4 of the common framework of data analysis) implied tracing events over time aiming at constructing narrative for subsequent analysis (Langley, 1999; Yin, 2009). As suggested
by Yin (2009: 148), “the analytic goal is to compare the chronology with that predicted by some explanatory theory”, the theoretical propositions. In this respect, the careful documentation of the case study enabled the researcher to address rival explanations. For example, it is theoretically suggested (in Chapter 5) that the Core RIC explains the direction capability, which explains the incubation capability. Thus, the direction capability is hypothesized to be an intervening theoretical construct. However, the careful documentation enabled the researcher to look for negative evidence (in the terminology of Miles and Huberman (1994: 271)) that was inconsistent with the proposed explanation. The chronology disconfirmed this intervening construct and the associated propositions. As such, it is eliminated from the causal chain. Thus the negative evidence enabled the researcher to revise the theory.

6.8.3 External Validity

According to Yin (2009), this test seeks to define the domain to which the a study’s findings can be generalized. It deals with the problem of knowing whether the findings of single-case study or multiple-case studies are generalizable beyond the immediate case study or case studies. He also states that the external validity has been a major barrier in doing case studies. In the current research project, the multiple-case design is used when collecting data regarding LI and LIII of the conceptual framework, and the synthetic strategy is used when analyzing the data. In this respect, Eisenhardt (1989), Miles and Huberman (1994), and Yin (2009) state that cross-case synthesis enhances generalizability. It allows for understanding the phenomena beyond the context of individual case, and increases the generalizability of the findings.

However, the external generalizability of single case studies is of particular importance as the findings of LII of the conceptual framework are based on single-case (embedded) design. In this respect, Yin (2009) states that critics argue that single cases offer a poor basis for generalizing. He suggests developing theory (theoretical propositions) before approaching the field study, and this tactic should be used during the research design. Thus, the theory developed will not only guide the data collection phase, but also represent the level at which the generalization of the case study results will occur. This is known as analytic (theoretical) generalization, which is contrasted with another way of generalizing results, known as statistical generalization. In short, Yin (2009) uses the theoretical generalization argument to defend the use of single-case study.
Other methodologists also use the theoretical generalization argument to defend the use of single-case study. For example, Robson (2011: 160) argues that single-case study does not preclude some kind of generalizability beyond the specific setting studied. In this case, the researcher seeks to develop theory that helps in understanding other cases or situations (external generalizability). In a similar vein, Stake (1995) differentiates between intrinsic and *instrumental* case research. In the former, the case is pre-selected, and more attention needs to be paid to the contexts. In the latter, some cases would do better job than others, and certain contexts may be important, but other contexts important to the case are of little interest to the study.

Contrarily to the previous, Bryman (2008: 392) also discuss the same issue (How can we know that the findings generated from these cases have some kind of general applicability?). That is the findings can be applied to all organizations of the type studied in the research. He criticizes the theoretical generalization argument, being limited to the generalization to theory which reflects the researcher ability to produce a good theoretical understanding of the cases studied (How well does the theory specify connections between the features of the case study?). He argues that, beyond the theoretical understanding, there would be a *residual worry* (What about the wider replicability, the wider relevance of the theoretical understanding? Does it hold in other contexts? What the broader relevance of the findings?). He believes that the theoretical generalization is, in fact, *moderate generalization*. He argues that the *moderatum generalization* (also known as the limited generalization argument) is more attractive in which the researcher tries to *tie* what s/he finds in the case study with comparable cases found elsewhere. This improves the confidence in the quality of findings. In a similar vein, Eisenhardt (1989) and Miles and Huberman (1994) state that tying the findings to extant literature enhances generalizability. In the current research, the three previous tactics (cross-case synthesis, analytical generalization, and moderatum generalization) are used to enhance the external validity of the findings.

**6.8.4 Reliability**

This test seeks to demonstrate that the operations of a study can be repeated, with the same result. That is, if a later researcher followed the same procedures as described by an earlier researcher and conducted the same case study all over again, the latter
researcher should arrive at the same findings and conclusions. The goal of reliability, thus, is to “minimize the errors and biases” in a study. The general way of approaching the reliability problem is “to make as many steps as operational as possible”. More specifically, three tactics are recommended. The first is the use of a case study protocol to deal with the documentation problem in detail. The second is the development of a case study database. These two tactics should be implemented during the data collection phases. The third is to maintain a chain of evidence (Yin, 2009: 45). In this respect, I have been able to follow the first and third tactics. The use of case study protocol has been discussed in section 6.3, and the establishment of a chain of evidence has been discussed in section 6.8.1.

Regarding the second tactic, creating a case study database, Yin (2009) suggests that the case study researcher needs to strive to develop a formal, presentable case study database, including: interview transcripts, documents, and case study notes. In this respect, publishing the case study database markedly increases the reliability of the entire case as the raw data will be available for independent inspection so that critical readers and other researchers can review the evidence directly and not to be limited to the written case study report. This is particularly important if the report will not present adequate data.

While that a case study database was built, the researcher was not able to publish it due to the ethical considerations highlighted in section 6.6.3. In this respect, Yin (2009: 188-189) recognizes this when discussing the “Case identities: Real or anonymous”, and the “Human Subjects Protection”. He implicitly, however, introduces an alternative tactic: the case study must display sufficient evidence. He states that the exemplary case study is one that “judiciously and effectively presents the most relevant evidence, so that a reader can reach an independent judgment regarding the merits of analysis”. In this regard, he provides the following recommendations. First, “the evidence should be presented neutrally, with both supporting and challenging data”. Second, the evidence should be selective, as presenting the entire evidentiary base “will bore the reader”. Third, the researcher should present enough evidence to gain the readers’ confidence that the researcher “knows” his or her subject, and s/he has “indeed been in the field, made penetrating inquiries while there, and has become steeped in the issues about the case”.

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6.9 The Obstacles of Conducting the Case Study

Many difficulties had been faced when conducting the empirical research. These can be summarized as follows.

**The impact of demonstrations and revolution on the fieldwork schedule**

During the two academic missions, the fieldwork coincided with few, small scale demonstrations as a result of major socio-economic and political problems. Most of these demonstrations were in Cairo, the Capital of Egypt, where the head offices of the banks and other governmental agencies located. These demonstrations caused disturbance to the fieldwork schedule; either through cancelling interviews due to a bad mode (on the part of the interviewee), or being unable to attend the interview or make the visit due to the traffic jam and/or the unusual security procedures taken place around these places. Furthermore, the researcher had not been able to undertake any telephone and Internet mediated interviews during February-March 2011 as a result of the general chaos associated the 2nd Egyptian Revolution (25th January, 2011). The lesson learnt here is that it might be useful for researchers to consult some political experts before identifying the period of the field work study.

**Meeting places lacked the quietness required to conduct the interviews**

Some of the key informants in the first academic mission and many of them in the second academic mission asked to conduct the interviews outside the workplace. Several luxury coffee shops and hotels had been chosen for this task. Since Cairo is not the researcher’s place of residence, the choice was left to the interviewee. Unfortunately, it was not a good choice. Most of these places lacked the quietness required to conduct the interviews, despite being an international brands. In many cases, a co-decision to stop the interview was taken, and the search for a quieter place was made. One of these interviewees, who had an experience in conducting interviews outside the workplace, recommended hiring a meeting room in a luxury hotel. The advice was valuable, and many of these interviewees accepted to undertake the interview in this place.

**A great shortage of innovation studies in the Egyptian service sectors**

There is a great shortage of studies related to (radical) innovations in the service sectors in Egypt, in general, and in the financial services sector, in particular. Since there was
no comprehensive, updated database connecting the libraries of Egyptian universities, the researcher had to visit each library separately. Unfortunately, the researcher was not able to find valuable theses related to the current work. Thus, it was difficult to find the data needed to ground the research, and to enhance the argument of the case study findings.

**Translating form Arabic to English is a time-consuming**

All the interviews were carried out in the Arabic Language. In addition, most of the documents producing the case study were in the Arabic Language. The researcher, thus, had to translate the relevant sources from the Arabic to English language. This, however, took a lot of time, and, hence, slowed down the research progress.

**Approaching key individuals without recommendation is extremely inefficient**

Although the researcher was concerned about producing all formal documents (e.g., official permissions) that would facilitate the access to all the financial institution in Egypt, approaching key individuals, especially officials and executives, formally and without recommendation was extremely inefficient. Personal relationships had played a critical role in this regard.

**Well-known trainers repeatedly use irrelevant metaphors**

The researcher faced much difficulty when investigating the NPVR with the development team of bank A, which led the incubation phase. These key informants are well-known trainers in their bank. While they have incredible ability to articulate knowledge, they tended to repeatedly use metaphors, citing examples that were not related to the NPVR. This had got the researcher out of his track, and another set of interviews was needed as the examples cited had no value to the current research.

**6.10 Summary**

I have sought to present and justify the research methodology employed in the current research project. I have adopted the “research onion” introduced by Saunders et al. (2009: 108) when discussing seven research layers. I have discussed and justified: the research philosophy (constructionism); the research approach (induction); the research strategy (exploratory/explanatory case study); the research choice (multi-method qualitative study); the time horizon (retrospective longitudinal data); data collection
techniques (semi-structured interviews, documents, and direct observation); and data analysis procedures (a common framework of process narrative and synthetic strategies). I have also discussed the four tests commonly used to establish the rigor of any empirical social research design (construct validity; internal validity; external validity; and reliability), and the 11 tactics implemented to meet these four tests. Furthermore, I have listed the main difficulties had been faced when conducting the empirical research.

In the research approach section, I have discussed two important points: the first relates to the theoretical tool (theory construction as disciplined imagination) used when developing an analytical conceptual framework before approaching the empirical investigation; and the second (theoretical concepts as constructs and the conceptual meaning of multidimensional constructs) seeks to clarify the misunderstanding associated with the development of theoretical constructs.

In Chapters 7-10, I will present the findings, discussions, and conceptualizations of LI, LII, and LIII of the conceptual framework. Chapter 7 will be assigned to LI (the dimensions of Core RIC and entrepreneurial (resource building) capability). Chapter 8 will be assigned to LII (the dimensions of the direction-incubation-acceleration capability framework of project management). Chapter 9 will be assigned to LIII (the success/performance measurement of radical service innovation). Chapter 10 will be assigned to the development of research propositions.
Radical Service Innovation Capabilities and Competences and its Performance Measurement in the Egyptian Banking Sector

Submitted for the Degree of Doctor of Philosophy

Tarek El Shafeey

University of Portsmouth
Portsmouth Business School

2013

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Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

The aim of this chapter is to present and discuss the findings related to core radical innovation competence (Core RIC) and entrepreneurial (resource building) capability. The chapter is organized in three sections. In section one, I will present the findings, discussions, and conceptualizations of the Core RIC. In section two, I will present the findings, discussions, and conceptualizations of the entrepreneurial (resource building) capability. In section three, I will provide a summary for the chapter. I, however, would like to start this chapter with three interesting quotations. (Please recall that Appendix A.3 shows the interview descriptive coding.) The first defines what theory is. The second exemplifies the market pull approach followed by many Egyptian commercial banks seeking to introduce new products and services. The third exemplifies the concept of comprehensive banking.

1. Theory is a documentation of reality. (E; Sen_1)

2. Innovation is how to satisfy your customers’ financial needs by leading them but according to their articulated and/or latent needs. Here is the important role of developers. Then, let these customers share the incremental innovation through product and process enhancement. Here is the important role of the front-office, sales and customer service people. (C; Sen_1)

3. Do not forget that, with the plethora of services provided, we have a clear business model: accepting money and lending money. This is our core business. And, one of our main goals is to increase the banking awareness and to lead customers towards the concept of comprehensive banking . . . how to make everything using our bank. (B; Sen_1)

7.1 Core RIC Dimensions

The findings and discussions with regard to the five dimensions underlying the Core RIC will be presented in this section. These are: (1) R&D capability; (2) IT capability; (3) cooperative (networking) capability; (4) managerial systems; and (5) innovation-friendly culture. (Please recall that each capability will be conceptualized as a second-order construct manifested by a set of first-order latent factors.) The complementarity among these five constructs will be discussed in Section 7.1.6.
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

7.1.1 R&D Capability Construct

This section presents the findings related to the R&D capability construct (the first dimension of the Core RIC). The findings suggest that there are four main factors underlying this capability construct. These are: (1) team capability; (2) proactive research capability; (3) contributors; and (4) potential absorptive capacity. The following is a presentation for the findings related to the four factors underlying the R&D capability construct.

7.1.1.1 Team Capability

I documented the evolution of the development activity of several banks. This section discusses the evolution and nature of the development activity of bank A. (Please note that Appendix A.5 provides some background information about bank A.) Following this is a comparison between the development activity of bank A and the development activity in other banks. The section will conclude that both the generalist development team (GDTs) and cross-functional (cross-divisional) teams are two essential team structures. While the GDT is responsible for the early phases of development, the later is responsible for the late phases of development.

Introduction

Bank A has several divisions, e.g., Commercial Crediting Division, Retail Banking Division (which was known as the Card Center before 2005), Investment Banking Division, and Research and Translation Division. The Commercial Crediting Division included, among others, the Corporate Lending Unit, the SMEs Lending Unit (which is also responsible for managing the Microfinance category), and the department of “General Subjects” in which a team of four members in addition to their manager had been responsible for answering any inquiry with respect to credit as a general subject (please note that this team will be called the Generalist Development Team (GDT)). It is critical to mention to the experience of some members working in the General Subjects department. Before joining this unit, the manager and other two team members were working in:

| Letters of guarantees, credit, and bad credit treatments. |
| Part of this experience was accumulated while working in the bank branches . . . the reality of the market, and the other part was accumulated from working in the head office. (A; Mid1) |
| Accounting [administrative function], credit operations, and bad credit treatments. (A; TM1) |
| Credit and foreign exchange operations in both branches and the head office. (A; TM3) |
Thus, the team had an experience nearly in all banking activities (except investment), encompassing marketing, operations, bad credit treatments, and administrative functions. This had enabled the team members to be able to identify the credit risk factors and how to control them.

The Success Stories of the GDT
This section starts by discussing the first success story of the GDT (developing a general credit policy for the bank). Following this is a discussion of several new products (incremental innovations) developed by the GDT.

The First Success Story of the GTD
In 2002, the vision of the top management team (TMT) of bank A crystallized in setting a new general credit policy for the bank (Corporate, SMEs, Retail, and Microfinance). The champion of this mission was the credit executive (which was also a board member). This champion formed a cross-functional team dedicated for this mission, which involved the members of the General Subjects department (5 individuals), in addition to another 17 individuals from different divisions, units, departments, and branches. This cross-functional team (the 22 team members) was given one week, and a separate location and facilities (five-star hotel) so that the 22 members would not be constrained by organizational procedures. After this week, the champion decided to filter the cross-functional team, to be the team leader, and to move the team to a more isolated place (a facility owned by the bank). The team size was reduced from 22 to 7 members. The filtration criteria were, among others:

- Analytical skills;
- Experience-based creativity;
- Communication skills;
- A good network of relationships . . . not only with the other bank’s divisions, but also with the outside bodies and institutions, especially the Central Bank of Egypt, and other commercial banks; and
- Negotiation skills. (A; Sen₁)

By job description, the five individuals of the General Subjects department were included in this mission in addition to another two members from the 17 individuals. The new team was totally isolated, even from their families. After three weeks, the credit policy of the bank was set with an integrated vision, financial models, etc. During the following six months, this credit policy was discussed with 66 departments and branches. The credit policy, thus, was modified and authorized, and the team was given a reward for this mission. Since then, the name of the department has been changed
from the General Subjects to the Credit Policies. The Credit Policies Department has been established to be responsible for: (1) setting and developing the credit rules, policies, and systems; (2) answering the related inquires; (3) and developing new products/services for the corporate, SMEs, Retail, and Microfinance Units. After discussing the history of the GDT, it is critical to discuss the development activity of this team.

**Several New Products (Incremental Innovations) Developed by the GDT**

The problem confronting the GDT was that, as shown in the research context, the (retail, SMEs, and microfinance) banking concepts were not well established in Egypt. (For example, the SMEs (formal and informal) business in Egypt was estimated to be 1 million customers, and was considered to be underserved by the banking sector. In this respect, the formal sector only represented about 10 percent (100,000 customers). Also, please recall quote 2/1.) Recognizing the great potential of the SMEs and Microfinance sectors, bank A has initiated an ambitious strategy to target these sectors by identifying their needs, and developing innovative financial products/services satisfying these needs. Thus, while they had performed their marketing (front-office) roles, the members of the GDT had adopted a mission statement enabling them to understand the needs of their customers, but from the experience base of the team. This statement was:

> Do not talk with me about your financial needs; talk with me first about your business. (A; TM1)

Despite the low awareness with regard to the banking concept, and intense customer resistance due to the dominance of the cash society values (Kamel and Hassan, 2003), the GDT had developed many products/services, some of which were imitative innovations, while others were incremental innovations. Examples of incremental innovations are: (1) the product of employees’ advances for individuals working in the governmental, public and private sectors (introduced in 2003); (2) the product of financing the natural gas connections to home, replacing the traditional Propane Gas Tank used in most of these homes (introduced in 2004); and (3) the product of financing the conversion of vehicles to be working by compressed natural gas (CNG) instead of petrol (introduced in 2004). These products are considered as incremental innovation because they required changes in the credit policy (like the guarantees taken), collaboration with new partners, new method for service delivery, and new way of collecting money (installment and interest). The last two product ideas were initiated by
the GDT, but were developed with the cooperation of the Ministry of Petroleum (MOP), and targeted the low income individuals who could not pay the gas connection cost (EGP 1,500) or the CNG conversion cost (EGP 5,000).

The gas connection product allowed the tenants of these homes to obtain the fund required without paying any down payment. The monthly repayments were added to the monthly gas bill and collected by the collectors of the gas company. The CNG conversion product was developed to encourage the owners of private and taxi vehicles to use the CNG as an alternative fuel (as mentioned in table 2.8), allowing them to obtain the fund required to convert their vehicles to be working by the CNG without paying any down payment. The loans were repaid through the use of Smart Cards. By doing so, bank A utilized the collection facility of his partner to receive the loan installments and interests from the clients. In this context, one team member stated that:

\[7\]
You think on behave of the gas company. You open a new market for the company and for us as well. And, you exploit its collection facility to collect the repayments. And we use this feature as enforcement. . . . Then, we elaborated on the success of this product [the gas connections product], and the new relationship with the gas company to develop the gas conversion product. (A, TM2)

The following success story was the participation in the National Program of Vehicle Replacement (NPVR). The role played by the GDT (in addition to the champion) will be covered in details in Chapters 8. Two important notes should be mentioned with regard to the development activity in bank A. First, although the bank has several divisions, the development activity has largely remained the responsibility of the GDT. For example, although the retail banking division was established in 2005, the developers at this unit lack the capability to introduce incremental innovations. The GDT manager made the following comment:

\[8\]
The people at the Retail Banking Division are more oriented towards . . . improving the current products [improvement innovations], imitating competitors’ products, and bundling and unbundling innovations, not the creation of really new products [incremental innovations]. (A, Mid1)

Second, the cross-functional (or more precisely cross-division) team capability is also well established. Any product/service that has been developed by the GDT and has a corporate or retail nature has been moved to the Corporate or Retail Divisions to be managed. Moreover, any product that has a template (standardized) has been moved to the Card Center to be managed. For example, several units have been established to
receive products developed by the GDT. Examples are: private auto loans; mortgage products; and the gas connections product. The manager of the gas connection unit made the following comment:

\[\text{Several products have been developed by the people at the Credit Policy Department [the GDT]. Due to the high potential of these products and being standardized, these products were transited to be managed through the advanced IT system of the Card Center. . . . So, the cross-division team capability is well based as we have participated in several transitions. (A, Mid2)}\]

**The Characteristics of the GDT**

It is critical to summarize the characteristics of the generalist development team (GDT), which had been responsible for developing a set of incrementally new products, including the financial product of vehicle replacement. Word table 10 lists the main characteristics mentioned by the credit executive (the champion), GDT manager, and the team members themselves.
### Word Table 10: The Characteristics of the GDT

<table>
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<th>Quotations</th>
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<td>Diversity of Knowledge</td>
<td><em>The team has superior complementary skills and thought worlds. Being working in this department, the team members are knowledgeable regarding all the credit policies of the bank, all the current portfolio of credit products, and all the credit regulations of the CBE.</em> (A, Mid₁)</td>
</tr>
<tr>
<td>Entrepreneurs</td>
<td><em>Able to take risks.</em> (A, Sen₁)</td>
</tr>
<tr>
<td>Goal-oriented</td>
<td><em>You set the goal and leave them.</em> (A, Sen₂)</td>
</tr>
<tr>
<td>Harmony</td>
<td><em>Some aggressive, others unaggressive. The chemistry of the team is balanced. They do not have problems in dealing with each others. There is harmony.</em> (A, Mid₁)</td>
</tr>
<tr>
<td>Well trained</td>
<td><em>Credit courses, future leader course, time management course, and few apprenticeship visits in international banks that have R&amp;D departments.</em> (A, TM₁)</td>
</tr>
<tr>
<td>Out-of-the box thinkers and solution finders</td>
<td><em>Being working in this department, you have to think-out-of-the box all the time. You always have obstacles that you try to overcome or at least go-around.</em> (A; Mid₁)</td>
</tr>
<tr>
<td>Knowledge articulators</td>
<td><em>Highly appreciated trainers. High communication skills.</em> (A, TM₂)</td>
</tr>
<tr>
<td>Flexible</td>
<td><em>Ideas are dropped as soon as they refuted. . . . No clingers. We can recover quickly and develop alternative solution if an idea was totally crashed.</em> (A, TM₃)</td>
</tr>
<tr>
<td>Wide network of Relationships</td>
<td><em>A wide network of relationships with insiders and relevant outsiders, including international bodies.</em> (A, Sen₁)</td>
</tr>
<tr>
<td>Previous personal relationship</td>
<td><em>So conflict could not cause troubles. You do not need to break the ice when the relationship starts from scratch. The lack of these relationships means the need for experimenting each others.</em> (A, TM₁)</td>
</tr>
</tbody>
</table>
| Previous working relationship | *Trust is well-established, especially after the several success stories.* (A, TM₁)  
  *Sign language is important because of working in the world of intangibles. . . . In other words, one’s promising idea is caught even though s/he could not say it. . . . Raw, shapeless solution is caught by the other members [externalized], given a shape [crystallized], enlarged and enriched if valid [socialized] and neglected if refuted. Then, the champion is the last gate of idea confirmation.* (A, TM₃) |
| The existence of temporary stress | *Temporary stress is acceptable and creates good ideas . . . long-term stress kills creativity.* (A, TM₃)                                                                                                                                                                         |

One major characteristic of the GDT is the previous working relationship, which enables the GDT to engage in a process of knowledge creation, leading to the generation of promising ideas and concepts.

**Forms of Development Teams Found in other Banks**

A similar process for knowledge creation conducted by a similar form of team was found in the small public bank B, which introduced two incremental innovations, in addition to few second-but better products. The acting director of this bank made the following comment:

> I isolated the four [development] team members [operations, risk, credit, and marketing] in a wide room that would take about 20 people, so that their chit-chat would be also around their
core business. . . . Innovation.

- There are four main integrated components of any product model: segment; parameters [features and criteria]; pricing model; and sales efforts. If the idea is totally new, none of these components would be clear at the start. So you need to listen to many people until being able to form the main components. . . . Each member in the team is required to prepare and present his own vision regarding these main components. Then, the rest of the team comments about this presentation to support, refute, or enrich the solution. . . . So, we go through several sessions until being able to develop an acceptable integrated solution. . . . From our point of view as the idea owner. (B, Sen3)

The previous findings suggest that the existence of a dedicated, generalist development team (GDT) is essential to be responsible for the early phases of the development activity which require a high deal of creativity. Moreover, the existence of a cross-functional (cross-divisional) team is also essential to be responsible for the late phases of development. There are, however, other two forms of teams that have been observed in other case studies: the dedicated implementer team; and imitator cross-functional team. Both forms of team were, in fact, none innovative. The former was followed in what might be called top management-based innovation, and the latter was followed in what might be called imitation-based innovation. In the former, an innovation consultant (a top management position) is hired for short-term contract (e.g., two years) to bring more ideas to the bank (not only in the field of product/process innovation but also organizational innovation). One IT engineer (technical wise) who participated in several development projects made the following comment:

* Please see the comment made by the R&D manager of this bank (in word table 45).

The latter form follows the more dominant way of competition through pure imitation. In one interview with the marketing manager who is responsible for new product
development in an Islamic bank, I had tried several times to know how new knowledge is created when introducing new products, and if there is brainstorming sessions conducted in this regard. The answer was:

*I told you several times that developing new products are easier than what you are talking about. . . . We have a lot of traditional banking products we want to cope with. We form a cross-functional team to see how the traditional product would be translated into an Islamic product. When doing so, we work closely with the Sharia Department*. So, we do not have time to innovate new products. I wish if we are able to meet the supply of traditional ideas. (H, Sen)

* Sharia is the principles of Islamic laws.

**Discussion**

Bank A and B have been responsible for introducing many incrementally new products to the Egyptian banking sector (please also recall Table 6.3). In these two banks, two team structures are found: a dedicated generalist development team (GDT), being responsible for the early phases of development; and a cross-functional (cross-divisional) team, being responsible for the late phases of development. The existence of GDTs is found to be essential as the GDT members possess several characteristics that enable them to engage in the knowledge creation process (externalization, crystallization, and socialization), leading to the creation of really new products. In fact, I find that this process is similar to the spiral process of knowledge creation introduced by Nonaka et al. (2001), which includes four modes of knowledge conversion: (1) externalization, from tacit knowledge to explicit knowledge; (2) combination, from explicit knowledge to explicit knowledge; (3) internalization, from explicit knowledge to tacit knowledge; and (4) socialization, from tacit knowledge to tacit knowledge. It is concluded, thus, that the GDT is the main source of really new ideas and concepts.

This key finding is consistent with the work of McDermott and O’Connor (2002) and O’Connor and Ayers (2005). They find that the existence of generalist development team, a core group of multifunctional individuals, is essential for making RI happens. They also find that the members of these teams are characterized by breadth of experience, in addition to depth, and have built wide formal and informal relationships, both inside and outside the firm. Moreover, they argue that cross-functional teams are wrong for radical innovation project, especially in its early phases. They, however, do
not deny the important role played by cross-functional teams in the late phases of radical innovation development.

There is no claim made here that cross-functional team is only used in case of imitation. The claim made here is that cross-functional teams do not play a promising role with regard to the creation of appreciable elements of knowledge, at least in the early steps of radical innovation projects. In other words, when the task requires a great deal of creativity and cooperation, the GDT can perform better than cross-functional teams. More explanation for this key finding will be presented when discussing the managerial systems (word table 38, mainly that “promotion is based on seniority and/or personal relationships, not based on personal capabilities and achievements”), and the innovation-friendly culture (word tables 43 and 46, mainly that many people and functions within the bank may prefer not to share knowledge and provide support, or may avoid risk and resist change).

Finally, it is suggested that communities-of-practices is another team structure that has been successful in introducing radical innovations in many industrial and service firms, including the financial service industry (e.g., Brown and Duguid, 1991; Coombs and Hull, 1998; Djellal and Gallouj, 2001; Dougherty, 1995; McDermott and O'Connor, 2002; von Hippel, 2005; Wenger and Snyder, 2000). I have investigated whether such team structure is found in the cases studies. However, I have not found any evidence that supports the existence of such a permanent, informal team structure. The main reason for the absence of such a valuable source of radical innovations may be that the financial intuitions studied put much emphasis on efficiency and sales target, and as such slack time has no place. Even, in bank A, the largest bank in Egypt, slack has no place. One team member made the following comment:

> We [the GDT] have several organizational roles, such as developing new products, answering inquires, in addition to our marketing role. . . . Slack time? . . . No. When we meet in the launch time or even outside the work, no one has the ability to talk about anything related to work. We need to free or mind after the hard hours of working. (A, TM₁)

### 7.1.1.2 Proactive Research Capability

Regarding the research activity, the Research and Translation Division in bank A is responsible only for undertaking *applied* research on the several economic activities (e.g., agriculture and industrial activities), in addition to the translation services. This
research is conducted by a team of researchers (some MBA and PhD holders) in Economics. The role of this team is to support the decision makers (developers) in other divisions by identifying the supply, demand, and gap. In this context, the GDT manager stated that:

The role of the Research and Translation Division is to undertake research specific to the different economic activities. . . . For example, it conducted a research on the Cotton Industry in Egypt to identify its general state: supply, demand, and gap. However, this division is not responsible for generating any product ideas. We are the decision makers who must create the product idea. When we took a decision to target this industry, we had to check and expand this research. We browsed Google searching for more detailed studies. We visited the Chamber of Cotton industry in the Federation of Egyptian Industries looking for more studies and information, and, most importantly, customer databases. . . . In short, the research relevant to creating new services is not a separate activity. It is our responsibility as developers. . . . By the way, the excellent product for this Research and Translation Division is the two-page, daily economic news which provides an outlook for the national and international markets . . . e.g., the economic decrees; the Egyptian Exchange; and the International Exchanges. (A, Mid1)

* Very similar roles and responsibilities for the Research Division, though with different names, are observed in the large and medium size local banks C and G. Bank D, however, depends more on the research facility of its International Group.

If a market segment looks promising, the bank undertakes exploratory market research. The market research activity is outsourced to large consulting firms. This market study, however, is undertaken following the highest mode of interaction, team mechanism, among the GDT and the contracted firm. The GDT manager stated that:

If an industry or a segment seems promising and is underserved by the banking sector, it deserves a go, and we outsource the market research to a consulting firm with high capabilities. . . . We did so in the SMEs Unit. With the cooperation of this partner, we undertook a qualitative and then quantitative study about this sector on the 27 Egyptian Governorates. At first, we [the GDT and the firm] developed a list of probing questions. Then, the firm conducted several interviews with a number of SMEs customers, while we was behind the scene [a glass], to see and listen. We updated and modified the list of questions. Then, the firm administered a large scale survey covering 1,500 SMEs customers in the 27 Egyptian governorates. Then, we managed to get the customer database, from the Federation of Egyptian Industries, for example. . . . Based on this study, we developed a three-year Product Map with a vision, mission, and strategic planning. . . . It is a costly study. But, we have been able to develop several really new products for this large, underserved segment. . . . And, at the end, some competitors free-ride and join us without a real study of customer needs (A, Mid1)
I am also able to investigate the research activity in the small bank B when following the strategy of wait-and-see to introduce second-but-better products (with new characteristics). The bank follows a less promising, reactive approach when developing new variants. Moreover, the bank undertakes consumer, market, and opinion research. The marketing and development acting director noted that:

> When developing our own variants, we contract the I-Score Organization to do market and competitor research. . . . Yes, the I-Score Organization has a huge database about many financial products. . . . the sales of each financial product, the market share of each competitor. . . . [Also], we try to catch new ideas through market surveys. In these surveys, the customer is asked if he has an experience regarding the bank products and then is asked if there is a need or problem that the current products do not satisfy. Also, the customer feedback regarding the product and process in addition to their feedback regarding the repurchase decision coming from the sales people provide us with valuable information in this regard. . . . We also undertake market surveys when developing new products to test the concept to know the percentage of customers favoring this new concept. (B, Sen3)

**Discussion**

The findings show that several banks undertake academic research in economics, which is essential to support the decision makers, the developers (as shown in word table 15). Moreover, the GDT of bank A undertakes exploratory marketing research, with the cooperation of consulting firms with high market research capabilities, that enables the team to explore the needs of new, underserved market segments (as shown in word table 16). Furthermore, bank B follows a less proposing research approach (e.g., contracting a less capable organization, the I-Score Organization, to do market and competitor research; undertaking customer surveys; and collecting customer feedback and opinions) when introducing its own variants (as shown in word table 17). It is concluded, thus, that undertaking consumer, market, and opinion research is essential for currently served markets, and undertaking exploratory marketing research is essential for new, underserved market segments. Undertaking exploratory marketing research is essential to understanding the latent and deep needs behind the customer problems. This could not be done with the absence of the developers themselves. Only by doing so, the GDT is able to identify and interpret the poorly specified market needs (due to the absence of codified information about the new, underserved market), and develop the relevant solutions for these needs. In this respect, one member of the GDT made the following comment:
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

The radical innovation capability depends on two factors. The first is how to conceive the market needs. The second is how to exploit your expertise when developing an effective mechanism to satisfy these needs. And, the latter is more important than the former. Because it is the market that accept or reject the mechanism. (A, TM1)

These findings are consistent with past research. For example, Djellal et al. (2003) and Miles (2007) find research in social sciences and humanities (e.g., economics R&D; consumer, market, and opinion R&D) occupies an important place in services. Of particular importance is the exploratory marketing research conducted by bank A. O'Connor and Ayers (2005) and O'Connor and DeMartino (2006: 488) find that the R&D capability of many radical innovators is equipped with “exploratory marketing [“growth”] group”, which is responsible for learning about (problems in) markets the firm is unfamiliar with, and to develop proposals for potential big opportunities in those domains based on its R&D’s technical richness (know-how). This is also more akin to what Nelson and Winter (1977) call capability push, and what Veryzer (1998) calls solutions searching for problems.

7.1.1.3 A Network of Contributors

It is observed also that several parties contributed to the innovation activity of the banks. This contribution ranged from the communication of new ideas to the development of idea proposals. The network of contributors involved: executives; and front-line employees.

Executives as Contributors

Executives may contribute to the really new product proposals by enhancing its conceptualization, or even add new characteristics to the list of characteristics introduced by the developers. In some cases, executives were found to address an industrial issue, generate ideas, and even create the integrated solution, as shown in the following quotations.

The executives and Board of Directors is the top of the bank in terms of professionalism. So, they have a very wide different view. They are able to identify more risk factors than you have expected when developing the new product. Then you have to fill this leak. In some cases, they may add other characteristics to the product when you discuss the product with them. (A, TM1)
The main source of profitability for us, as a financial intermediary, is the maturity mismatching: accepting short-term, low cost deposits; and providing long-term, higher interest rate loans. In 2001, all banks were facing the resource shortage problem. . . . According to the regulations of the Central Bank of Egypt, any bank had to deduct 14 percent of a deposit as a reserve, and assign 20 percent for liquid assets . . . cash and T-bills. Thus, we were allowed to lend only 66 percent of the deposit. This did not only reduce our profitability, but also limit the funds we were able to lend. But, we had more lending opportunities, and the interbank loans were very short in time . . . 1-30 days, and cost us about 8 percent, more than the cost of deposit. Thus, we needed a new source of funds that could: (1) enable us to lend 100 percent of these funds; (2) last longer maturity . . . five years for example; and (3) cost us less. We needed a product providing solutions for all these problems. The bank executives involved in several brainstorming sessions that started with these three main issues, and ended by a new product in the Egyptian banking industry . . . the Millionaire Certificate*. Now, the sales figure approaches 1,000,000 certificates, and we have been able to attract more than 500,000 customers most of which were under bankable. And guess what . . . the more certificates you sell, the less cost you bear. (B, Sen_1)

* The certificates main characteristics were: face value of EGP 100; maturity of 5 years; four draws each year (EGP 1,000,000 for each prize); and redemption value of EGP 116 (only at the maturity date). Thus, the certificate holder buys one certificate in return of EGP 116 at the end of the five years, in addition to 20 entries during the five years. Several variants have been developed thereafter (Source: the website of bank B).

### Employees as Contributors

Front-line employees and other contact personnel are identified also as a valuable source for (ideas for) innovation. They are the ones who interact with the customer at service encounters. The following notes are made in this regard:

> The internal Website designed to collect any ideas and suggestions is very useful. We have begun to receive new ideas from many individuals, especially front-line employees. And, it was surprising to find that many useful ideas have come from the front-line employees in rural areas. . . . Why? Because it is not a well served segment. (C, TM_1)

> We initiated an idea bank several years ago. Our employees were proactive and provided us with many new ideas. Some of these ideas were innovative and practical and covered nearly every aspect not only related to the product and process but also organizational development. There was also an active feedback system in which my team asked for more clarification; idea initiators were asked to provide a proposal; or at least were given a thank you and appreciation words. However, we have recently initiated a project to transform our organizational structure from the mixed structure to the matrix structure. This recent initiative has got all my time and effort, and the feedback system, and as such the employee initiative has become to shrink. But, I am thinking seriously to reactivate this system. (E, Sen_1)
Discussion

The findings show that executives, and front-office employees and other contact personnel represent a valuable source for (ideas for) innovation. Of particular important are the bank executives. They are found to be a source for ideas, leading to phenomenal success (as shown in word table 20). Thus, in addition to the GDT and proactive research capabilities, others contribute to the R&D capability of commercial banks. Even the GDT recognized the critical role played by these contributors (as will be shown in word table 40, mainly the “idea bank” seeking to collect “new ideas from internal and external sources”).

The fact that front-line employees and other contact personnel are considered as a valuable source (for ideas) for innovation is well recognized in past innovation research in the service context. In this respect, using employees’ suggestions is found to be a key within the market-driven approach to innovation (Akamavi, 2005; Djellal and Gallouj, 2001; Drew, 1995; Ordanini and Parasuraman, 2011; Sundbo, 1997). Past conceptual research (Lado, et al., 1992: 80) also recognize the role of executives in “gap filling”, the identification of unmet customer needs by introducing unique product offering. What is interesting in this finding, however, is that executives are found to be a valuable source in addressing industrial issues, and developing promising solutions for these issues.

7.1.1.4 Potential Absorptive Capacity

In Chapter 5, the potential absorptive capacity is described as the initial knowledge base accumulated to serve future major innovation projects. Thus, this dimension needs to be discussed and analyzed by taking into consideration the future radical innovation project, the National Program for Vehicle Replacement (NPVR), which will be discussed in details in Chapter 8. As shown in Section 2.3, this CDM related national program is classified as an environmentally oriented program, seeking to introduce a commercial mechanism for replacing the aging fleet of vehicles with more recent, less polluting, and saver vehicles. Moreover, it targets mainly the low income vehicle owners. In this respect, bank A was chosen to lead the early phase of development because the R&D capability of bank A was embedded by the potential absorptive capacity through introducing a series of incremental innovations along the same innovation trajectory, and serving the same under-bankable, poor segment.
It has been shown in the team capability section that the GDT of bank A has initiated and participated in several development projects seeking to introduce financial products targeting the low income segment. Moreover, one of these products (the product of financing the conversion of vehicles to be working by compressed natural gas (CNG) instead of petrol) is an environmentally related project. Furthermore, the bank has been active in developing CDM related financial products (loans) for SMEs and corporate sectors. Since late 1990s, the bank has participated with the Egyptian Environmental Affairs Agency (EEAA) and some international bodies (e.g., the World Bank, the Kfw) in several projects for agricultural and industrial pollution control, being the most involved bank in Egypt in these environmentally oriented projects. Thus, such engagement in environmentally-related projects intended to introduce financial products for the corporate, SMEs, and microfinance sectors has enabled the bank to accumulate an initial, sufficient stock of market and technical knowledge relevant to these environmentally oriented projects. In fact, this initial level of absorptive capacity qualified bank A to be a key actor in the NPVR. It should be noted also that this potential absorptive capacity was accumulated by introducing incremental innovations along the same innovation trajectory, and some of these innovation projects had an exploratory nature. The manager of the GDT noted that:

\[23\]

*Many of the environmentally related financial products we have introduced were based on pilot projects. So, we had participated with the EEAA, the World Bank, the Kfw, etc. in several pilot projects intended to develop commercial mechanisms that would be replicated later. . . . The main advantage of these CDM related pilot projects was that we had been able to experiment. So, we had been able to test our assumptions, and we had been able to correct them. Now, we have been able to move easily from one CDM project in one sector to another CDM project in another sector. . . . That is because our knowledge about these types of CDM development projects is taken-for granted. . . . Because it is tested in and modified according to our reality. (A, Mid1)*

**Discussion**

The previous finding show that accumulating potential absorptive capacity, that would service future major innovations, is one main dimension that needs to be taken into consideration when conceptualizing the R&D capability. That is because absorptive capacity has a path dependnet nature. The finding also shows that the potential component has an exploratory nature (e.g., the “pilot projects” mentioned in word table 23). This finding is consistent with past research, which suggests that prior knowledge
enhances the firm’s absorptive capacity, and as such the R&D capability. Past research also suggests that absorptive capacity is cumulative and has path dependent nature (e.g., Cohen and Levinthal, 1990; Davies and Brady, 2000). Zahra and George (2002: 185) suggest that the “potential” component of absorptive capacity should be accumulated before the “relaized” component. Barras (1990) and Windrum and García-Goñi (2008) find that several services industries (including banking and insurance) undertook several development projects along a new innovation trajectory before being able to introduce major product/process innovations along the same trajectory as these projects could increase the stock of knowledge and thus the absorptive capacity. Lane et al. (2006) also suggest that the potential component has an exploratory nature. In a similar vein, McGrath and Ming-Hone (1996) find that experimental learning increases the degree of causal understanding of the development team, and as such increases the team proficiency, which leads to a high degree of innovation competence.

7.1.1.5 The R&D Capability (Construct)

The previous findings and discussions show that the R&D capability is manifested by four latent factors: building team capability (a generalist development team (GDT), and cross-functional teams); undertaking proactive research (especially the exploratory market research); establishing a network of contributors (executives, front-office employees, and contact personnel); and accumulating potential absorptive capacity along the same innovation trajectory perused. Based on the previous findings and discussions, the R&D capability is conceptualized as a second-order construct manifested by four first-order factors as shown in figure 7.1.

Figure 7.1: R&D Capability as a Second-order Construct

![Diagram showing R&D Capability as a Second-order Construct]

Source: Self.
Thus, financial institutions, seeking to develop a high degree of R&D capability, need to develop an effective mechanism to be able to accumulate the desirable level of each first-order factor. As a theoretical (second-order) construct, these factors are not substitutes. Rather, they are found to cover the domain of the R&D.

### 7.1.2 IT Capability Construct

This section presents and discusses the findings related to the IT capability construct (the second dimension of the Core RIC). The findings suggest that there are three main factors underlying this capability construct. These are: (1) CORE banking systems and other applications; (2) IT experience; and (3) IT hardware. The following is a presentation for each factor.

#### 7.1.2.1 Universal CORE Banking and other Applications

More recently, bank A has made huge investments in one of the most advanced and sophisticated IT systems (FLEXCUBE) designed specifically for the banking industry, and intended to increase efficiency and improve operations. This advanced and sophisticated solution, however, is currently implemented. It should be noted also that the bank was not the first among its competitors in adopting this Centralized Online Real-time Exchange (CORE) banking application although the bank was the first Egyptian bank to adopt the ATM technology (the Card Center). In fact, it is the fifth bank to adopt this technology. The IT general manager (technical wise) made the following note:

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**Well, we are behind our competitors because of: (1) the bureaucracy; and (2) the large size of the bank and the long transitional period needed to move from the current system to the new one. But, despite being the largest bank in Egypt, it would take three year transitional period to gradually go live and shutdown the old system. Our plan is to implement the new system in 40 branches each month, study the implementation problems, accumulate learning, and involve other 40 branches, etc. And, we have established two-floor center filled with IT specialists, especially from India to accelerate the implementation process, and train our IT engineers and specialists*. . . . But, you should note that some of our competitors had spent five years until being able to shutdown the old system. (A, Sen.)**

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*Most of the Indian IT specialists are from the IT supplier hired to drive the implementation process.

This universal CORE banking system can accommodate combinations of financial services: e.g., retail banking; securities trading. Therefore, it is not an account or even a
business centric. It is a customer centric that can transfer data easily among accounts and businesses. This facilitates the identification of customer trends, and thus the selling and cross-selling opportunities. Such sophisticated technology, however, does not only have a great impact on the production and delivery of services, but also on the innovation activity itself, in several ways as shown below. The small, though international, bank D was able to exploit such capability to introduce the first real Private Banking Product in Egypt. The product has a bundling nature which combines bank account with the investment in options and futures. Analysts at this bank used data modeling to segment the small cliental base based on number of segmentation variables, including channel preferences, profitability, credit risk profile, and the tendency to purchase other products. The R&D manager of bank D made the following comment:

Such advanced segmentation enabled us to segment our client base into tightly profiled micro segments. Thus, we have been able to design new products that really satisfy each segment needs. Now profitable customers are treated differently through the RM [relationship manager]. . . . For example, we have designed a series of option and future products for the upper-upper segment that deals with foreign securities, currencies, and interest rate swaps. And we use the research facility in the international head office to provide us with an excellent International Market Outlook. And, we have trained our RM to provide the advice service which is the core of this product. . . . After the success of this product, we updated the dealing room to provide instant price-execution. . . . Now, our customers browse CNNMoney in one hand, and hold the phone talking with our expert RMs using the other one. . . . It is the age of information technology. (D, Sen1)

The features embedded in these sophisticated IT applications can also stimulate new product characteristics. One manager made the following note:

CORE banking solutions are developed in developed countries with modern financial services industries. Thus, there are numerous features on the system that can provide our service developers with new product characteristics. So, ideas for new product characteristics may be approached not only form the business wise but also from the IT wise. (C, Mid1)

Other IT applications play also roles that have more enabling nature. First, productivity suits (e.g., MS Office Word, PowerPoint, and Visio) are used when undertaking the design paperwork but only for writing the operational details and visualizing data for illustration purposes (e.g., presenting the product memo). No sophisticated software for development is used, and no paper prototype, in the strict sense, is produced. (Please note that it was observed that drawings were used only if the delivery system included a
series of encounters. Figures 2.3 and 2.4 are cases in point. It was also observed that drawings were used if the branches that would receive the new product would need to be redesigned.) **Second**, other more traditional forms of IT (e.g., e-mail) are used in the inter- and intra-organizational communications to coordinate the innovation activities and exchange information. **Third**, as shown previously, the role of employees as contributors is facilitated also by the IT applications. For example, the IT people in Bank C had initiated an internal Website (“ExperienceShare”), in which all employees can complain and also provide feedback and suggestions. These ideas are forwarded to the board of directors’ offices to be summarized and presented. A very similar example was presented regarding bank E.

It might be useful to make a final note regarding the role of IT applications (as enabler) in the development activities. The finding show that developers use traditional software (e.g., Word and Visio), and there is no advanced software used by these developers which may have a negative impact on their productivity. One acting director made the following comment when asking him about the software used by his team of developers:

> **Advanced software for development? . . . I never heard or even thought about this. But, please if you know the name of providers of such software, let me know. This could prevent us reinventing the wheel each time we develop new product.** (B, Sen. 3)

**7.1.2.2 IT Experience**

The IT capability is not only related to the IT systems and solutions, but also IT experience. One acting director noted that:

> **One capability we chose to penetrate the market, create a market sound, and increase the brand awareness was the IT capability. . . . We asked our system provider to develop IT system specifically for us. It was intended to provide unique Islamic financial products. . . . The first product developed was the first Islamic credit card in Egypt with some unique characteristics . . . e.g., 58 day grace period instead of the traditional 55 days, and revolving complied with Sharia. . . . When we decided to add new-to-the-market characteristic to the personal loan we did not find a feature on the system that enable us to add this characteristic. And, when we asked our system provider to update the system with the new feature required, the provider told us that this would be a customization and we must pay extra money. . . . The cost was very high, and it was just one characteristic. It was not a totally new product. Thus, we decided to try. . . . The brilliant IT manager who attended the system implementation had tried many features on the system that could enable us to introduce the new product characteristic.** After
several trials and errors, he succeeded. . . . So, if you have brilliant IT experts, you can develop alternative uses for the system features. (B, Sen$_3$)

In addition, part from the development process is handled in a prototype facility in which IT specialists create a real environment similar to the live one that would handle the product to undertake a simulation scenario. This, however, is seen as an experimental development. One IT engineer made the following comment:

We provide a real production environment . . . a machine equipped with real information in addition to an expert [simulator] to test the product characteristics. Several experiments are made with a snapshot being taken for each one until the product is well based on the system. Both of us [the idea owner and the IT specialist] test all possible scenarios on the system, and simplification or modification may be needed if the results show flaws in the product design. . . . As we are a business-led, we may need to slightly adapt the system to suit the new product. We also may suggest the use of some features that would enhance the product operations. These scenarios may take few weeks of experiments. . . . When the product is well based on the system, and it is safe to go live, we produce the User Acceptance Test. (C, TM$_1$)

The impact of the IT experience on the innovation capability may be summarized in the following quotation:

The ready-made packages are available everywhere, and they are very useful. But, the more IT experience you accumulate in-house, the more IT-related tools you possess to be creative and introduce new products, and also to be process enhancer. . . . In other words, you still need to develop the expertise in understanding and exploiting these technological advantages. (C, Sen$_1$)

7.1.2.3 IT Hardware and Infrastructure

The IT infrastructure is a third dimension suggested by the case study findings. For example, the enabling role played by the other IT applications (e.g., used in communications during the development process) depends on not only the characteristics of these applications, but also the characteristics of its complement (the hardware used). Also, as shown in word table 29, part of the development process (experimental development) is undertaken in a prototype facility (e.g., machine) that provides a real production environment to undertake simulation scenarios. However, the contribution of the IT hardware is not only limited to enhancing the development activity, but also may be translated into new product characteristics. As shown in word table 25, bank D updated the dealing room to speed up the process of order execution
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

and to provide the characteristic of instant price-execution (incremental innovation according to the characteristics-based approach adopted). (Please recall that, according to the characteristics-based approach, incremental innovation represents bit-by-bit improvement.) Furthermore, other characteristics (e.g., reliability and data security), which will be shown in word table 49, belong also to the incremental innovation. Generally speaking, it will be shown in word table 49 that the IT infrastructure is described as the “backbone” of the commercial banks that do not only increase the efficiency and improve operations, but also enhance the innovation activity itself.

**Discussion**

It is concluded from the previous findings that the (1) IT hardware and infrastructure; (2) universal CORE banking application and other enabler software; and (3) IT experience play a critical role in the innovation activities of banks. These findings suggest the following definition for the IT capability.

**IT Capability Defined**

The IT capability may be defined as the hardware, software, and expertise that can translate (reactively and proactively) all the businesses’ needs and concepts into competitive products through the technological medium.

The findings related to the dimensions of IT capability are somewhat consistent with the relevant literature. Though, one major benefit of case study research is that the findings provide more clarification and details for the IT capability in the banking industry, which facilitate conceptualizing it as a theoretical (second-order) construct manifested by three dimensions. This conceptualization is somewhat consistent with the work of Tippins and Sohi (2003), in which the IT capability construct is conceptualized to be manifested by three latent factors: IT objects (computer-based hardware, software, and support personnel); IT knowledge (possessing a body of technical knowledge about objects such as computer based systems); and IT operations (utilizing IT to manage market and customer information). The factor of IT objects is somewhat similar to the factor of IT hardware and infrastructure, the factor of IT knowledge is similar to the factor of IT experience, while the factor of IT operations is somewhat similar to the factor of Universal CORE banking and other applications. There is a slight modification, however, to the conceptualization of Tippins and Sohi (2003). Universal CORE banking application replaces the IT operations as I find that these operations
(e.g., data mining and segmentation) are codified and embedded within the CORE banking solution. On the other hand, previous empirical research in service innovation has tended to: (1) describe several dimensions of the IT capability without developing construct (e.g., Barras, 1990; Gallouj, 2002); (2) use only one dimension, like the IT experience (Menor and Roth, 2008); or (3) integrate more than one dimension into unidimensional (first-order) construct, IT (e.g., Froehle, et al., 2000). Moreover, other theoretical studies (e.g., Johnson, et al., 2000) treat the IT only as an enabler. However, the empirical findings show that the IT is more than just an enabler as it can provide characteristics to the service developers.

7.1.2.4 The IT Capability (Construct)

Based on the previous findings and discussions, the IT capability is conceptualized as a theoretical (second-order) construct manifested by three first-order latent factors, as shown in figure 7.2.

**Figure 7.2: IT Capability as a Second-order Construct**

![Figure 7.2: IT Capability as a Second-order Construct](source: Self)

Thus, financial institutions, seeking to develop a high degree of IT capability, need to develop an effective mechanism to be able to accumulate the desired level of each first-order factor. As a theoretical (second-order) construct, the lack of one factor will reduce the value would be extracted from the other factors, and would represent a bottleneck in the system of this capability. In other words, these factors are not substitutes. Rather, they are found to cover the domain of the IT capability in the banking industry.

7.1.3 Cooperative (Networking) Capability Construct

This section presents the findings and discussions related to the cooperative (networking) capability construct (the third dimension of the Core RIC). The findings suggest that this capability, establishing strategic (successful) relationships with
germane suppliers and partners, enhances the innovation activities and achieves *nine advantages*. In other words, the findings suggest that there are nine main latent factors underlying this construct. These are: filling the competence gap; building trust; sustaining growth; enhancing adaptability; creating the innovation routine; easing crises; developing effective communications; reducing uncertainty; and reducing cost.

### 7.1.3.1 The Advantages

Banks A and C are two of the largest and oldest commercial banks in Egypt, and have established very wide networks of relationships with germane national and international suppliers and partners. This provides an excellent opportunity to conduct an in-depth investigation to the role of suppliers and partners in the R&D activity. Based on their experience with national and international suppliers and partners, the developers of these banks have been able to provide nine advantages achieved from building successful working relationships, especially with regard to the development activities. Word table 31 presents the quotations providing support for the nine advantages/factors.
Word Table 31: The Advantages of Cooperative (Networking) Capability

<table>
<thead>
<tr>
<th>No</th>
<th>Advantages/Factors</th>
<th>Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Filling the competence gap</td>
<td>Building the in-house IT experience does not substitute establishing successful relationships with system providers. These partners provide us with ready-made applications with the functionality required. Also, such providers can easily provide us with the applications in which any change in international regulations is integrated . . . , like Basle Accord . . . We lack the capability to do that . . . We also have to work closely with these suppliers when translating our business needs if the new product requires a high level of system adaptation or the system does not give us the flexibility to do so. In these cases, supplier involvement in the development project is critical. And, you have to know that, in some cases, we need to consult, negotiate with, and get the approval of our suppliers before submitting the product proposal for authorization. In this case, you are not the sole decision maker. (C, Sen₁)</td>
</tr>
<tr>
<td>2</td>
<td>Building a high level of trust</td>
<td>Previous working relationships enable the mutual testing of capabilities and commitment. Thus, trust is cultivated. (A, Mid₁)</td>
</tr>
<tr>
<td>3</td>
<td>Sustaining growth</td>
<td>Cultivated trust opens a window for new experience and knowledge bases. This has two main advantages. First, it enables you to generate more new ideas, thus being able to open new windows of development opportunities in specific fields. Second, it promotes mutual learning. (A, Mid₁)</td>
</tr>
<tr>
<td>4</td>
<td>Enhancing mutual adaptability</td>
<td>Achieve some sort of mutual dynamic adaptability. (A, TM₂)</td>
</tr>
</tbody>
</table>
| 5  | Creating the innovation routine | - Improve the quality of information exchange.  
- Increase flexibility, and reduce negotiation and conflict by being able to make joint-decisions and accept mid-solutions. There is always a half way point.  
- Accelerate the decision making process.  
- Informal decisions are taken at the lower level and blessed at the strategic level, and then implemented even before sending formal documents and signing the minutes of meeting. (A, TM₁) |
| 6  | Easing crises | Bugs and debugs are identified easily and fast, and without difficulty and deteriorating the relationship. (A, TM₁) |
| 7  | Developing effective communications | Encourage the informal, lower level communications among the teams' members in addition to the strategic level communications among the heads. Thus, all the vertical chain in the bank [from the champion to the team members] has developed personal relationships with some partners' vertical chains. (A, Mid₁) |
| 8  | Reducing uncertainty | Assumptions are circulated among the key actors and validated based on their experience base. (A, Sen₁) |
| 9  | Reducing cost | The development cost is shared among the partners . . . For example, if the idea owner is not the bank, the market research and other studies, which are more specific and confined to the targeted opportunity, are conducted by these partners, and the bank is joined in a later stage. (A, TM₁)³ |

*An example is the market, economic, and environmental studies related to the baseline context of the NPVR. As shown in Section 2.3.1, these studies were undertaken by the EEAA (the idea owner of the NPVR, and a key strategic partner of bank A). The studies sought to: describe the characteristics of operations; identify the ill-defined market needs, and recognize the economic and environmental opportunity of replacing the aging fleet of vehicles. Moreover, two (failed) pilot projects were also conducted by the EEAA in this phase, and a complex set of obstacles were identified. The commercial bank A was involved later (in the incubation phase) to develop a commercial replacement mechanism through a third pilot project. In short, all the studies and pilot projects undertaken before the incubation phase were the responsibility of the EEAA.
Discussion

While the advantages of building cooperative (networking) capability, through establishing strategic relationships with germane suppliers and partners, are recognized in the relevant literature (e.g., Pennings and Harianto, 1992; Ritter and Gemünden, 2004; Story, et al., 2011), few scholars have sought to take the complex nature of this capability in their conceptualization. For example, Sivadas and Dwyer (2000) state that nearly 70 percent of NPD alliances fail, and that building external networking capability is found to be key to alliance NPD success. They, however, conceptualize this capability as a theoretical (second-order) construct manifested only by three first-order latent factors: (1) high level of trust, which is similar to factor 2 in the current conceptualization; (2) effective coordination, which is similar to factor 5 in the current conceptualization; and (3) effective communications between partners, which is similar to factor 7 in the current conceptualization. They, however, do not claim that these three factors exhaust the domain of this capability construct. In a similar vein, Herrmann et al. (2006) conceptualize this construct as a first-order latent factor. The current work, however, provides more promising conceptualization for the cooperative (networking) capability than past research. As shown in word table 31, this capability needs to be captured by 9 factors. Thus, this conceptualization adds 6 first-order latent factors to the work of Sivadas and Dwyer (2000).

7.1.3.2 The Cooperative (Networking) Capability (Construct)

Based on the previous findings and discussions, building a cooperative (networking) capability, through establishing strategic relationships with germane suppliers and partners, is found to be a valuable resource, and that it needs to be conceptualized as a theoretical (second-order) construct manifested by nine first-order latent factors, as shown in figure 7.3.
Thus, financial institutions, seeking to develop a high degree of networking capability, need to establish relationships with suppliers and partners that enable these financial institutions in achieving these 9 advantages.

7.1.4 Managerial Systems Construct

This section presents the findings and discussions related to the managerial systems construct (the fourth dimension of the Core RIC). The findings suggest that there are four main latent factors underlying this construct. These are: (1) effective mechanism for internal selection; (2) effective training mechanism; (3) entrepreneurial retention; and (4) job rotation. The following is a presentation for each factor.

7.1.4.1 Effective Mechanism for Internal Selection

The general selection criteria of several banks do not explicitly take into consideration the innovative capability of fresh graduates. Such a capability, however, is developed on-the-job, and thus designing an effective mechanism for internal selection is found to be essential. One member of the GDT of bank A noted that:
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

To be creative in our career, you have to be knowledgeable about and competent in your area. After this, you might be able to improve, modify, or innovate in this area. It is not possible for a fresh graduate, even a genius one, to be able to destroy and rebuild the system. He or she should accumulate the experience first. That is why the R&D is not a separate activity, and the number of researchers in our bank is few. (A, TM3)

Following a visit to an international bank, one member of the GDT got a valuable idea with regard to the internal selection mechanism. He designed a mechanism and presented it to the GDT manager that approved the mechanism. The internal selection process is shown below.

In one international apprenticeship program, the R&D manager of a South African bank, which allocates 5 million Rand annually for developing new products that might succeed or fail, told me that: To be a leader, it is not necessarily to be wow; it is necessarily to surround yourself by out-of-the-box thinkers. I asked him for more clarification. He said: Forget about design, development, and products. If you are able to choose individuals with a high degree of intelligence, I am sure that your outputs will succeed. I implemented this advice when adding new members to the development team, and I found it very useful. I asked the HR manager to make an internal post for the development activity. 7 individuals were sent to me and I began the process of screening and selection to choose the qualified ones. My plan was to choose 3 individuals. The process passed through 2 phases. The first was to tell him or her about the job nature. Also to tell him or her that dancing on the rope is the norm in this job, and in some cases, thinking illogically and irrationally is required. As the answer by yes was not enough, I had to watch his or her face impressions during this conversation to identify his or her psychological and emotional readiness. The second was to answer an [intelligence quotient] IQ. After this process, I chose two instead of three. I found them having the ability to play the required roles. Since then, this process has become a routine. (A, TM1)

7.1.4.2 Effective Training Mechanism

By analyzing the relevant documents of several banks and undertaking several interviews with many developers, I have been able to identify three levels of training: (1) general training; (2) specialized and advanced training; and (3) R&D related training. On the general level, all the bank staff (from the teller till the head) is encouraged to undertake postgraduate studies (MBA and PhD), in which the bank shares 50 percent of the program cost. Also, soft-skills courses, like etiquette and communication courses, are given, especially for front-line staff. More specialized and advanced programs, like CMA and CFA, follow different mechanism. Candidates pass through several filtration tests, and the successful ones are nominated to take these courses in international universities working in Egypt. The most promising training
program conducted is the Future Leader Program in which the candidate passes through several, hard-to-pass filtration tests, and, upon success, attend the program, in local and international organizations (in Switzerland). Regarding the R&D activities, the basic training is done through on-the-job training and apprenticeship programs. The manager of the GDT of bank A noted that:

The new team members should read all over-the-table product proposals, and attend all the new product development meetings, especially brainstorming sessions. Individuals with superior performance are then nominated to more promising apprenticeship programs in which they are sent to international banks for few-weeks scholarships to acquire the best-in-class experiences that will serve future development projects. These international visits are not only intended to accumulate the innovation capability of developers, but also to renew it. (A, Mid₁)

7.1.4.3 Entrepreneurial Retention

In the huge-size bank A, which has introduced the highest number of product innovations (as shown in table 6.3), rewards and promotions are found to be a major issue for entrepreneurs, and as such, there is no organizational system to fairly reward and retain these individuals, other than the psychological recognition. The GDT members noted that:

Well, it is our job to develop new products. So, there is no project bonus whatever the success the new product would generate other than recognition and appreciation letters. These letters were highly appreciated, and also were very important to my CV. But, this may be sufficient at the start of the development career. After several success stories, it is fair to get more. . . . But, I do not get more. I get the same salary and the same bonus exactly like anyone else in the same position. I considered quitting. I met the chairman himself to discuss this matter. . . . He told me: Stay. . . . Without any promotion. . . . Without any rewards. . . . I am staying here because this is the largest bank in Egypt. . . . I will not find these huge resources anywhere. But, this does not mean that I am happy. I am frustrated. (A, TM₁)

The Thank You Certificates received from the chairman had a substantial psychological impact. . . . But, I always ask myself if I stay like this, when I would be able get a better position. Getting a better position in the current place [bank] is a great issue . . . for two reasons. First, promotion is based on seniority and/or personal relationships, not based on personal capabilities and achievements*. . . . It is the bureaucracy. Second, our structure is very tall and filled with people. (A, TM₁)

* This may explain, in part, why the GDT team instead of cross-functional team is more relevant to the Egyptian culture. Cross-functional teams may have a negative impact on the team
productivity and innovativeness. Professional team members try to test the knowledge of any new comers to the team. Also, time is wasted in breaking the ice. Please recall word table 10.

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<td>I had a job offer in a financial institution in Arabian country for about 7 times my present salary. But, I do not like to leave the place I built and the reputation I accumulated among my peers. Also, I do not like to leave the team. And, the champion. I am proud to work with such a man. In fact, my wealth is here. In this place. (A, Mid₃)</td>
</tr>
</tbody>
</table>

In the banking industry, designing fair and promising rewards scheme for entrepreneurs is critical especially in large banks in which: a large number of employees work; the hierarchical structure is tall and complete; and most importantly the number of entrepreneurs is few. The acting director of the small bank B made the following comment.

<table>
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<th>38</th>
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<tbody>
<tr>
<td>The quality of the HR systems is critical to retain the sources of innovation that are always followed by your competitors. I have worked in three banks so far, and in a venture capital company before this. I believe that less than five percent of staff in the banking sector is innovators*. Also, what is the number of individuals responsible for product development in the Egyptian banking sector? It is about 20 managers. So, competitors can identify them easily, address their problems with their current employers, and target them and their teams with more promising financial and nonfinancial package . . . e.g., doubling their salaries; giving them more freedom; higher authority level . . . top rather than middle management positions; and appreciation. This is especially important as innovators may flee from organizations with a very tall hierarchy if they feel that they would be buried in this hierarchy and would not smell a post in the senior management. . . . Excellent and influential sales people and managers take a market share with them when leaving the bank. They are treated fairly. Also, if you are not able to retain your innovators, you will not be able to grow by introducing new products. Innovators are the creators of market share and survival in the long run. You also will not be able to prevent the know-how from being leaked to your competitors. . . . No, this is not unethical. I am not talking about secrecy agreements. I am talking about our experience. So, the HR manager should see these people as a valuable asset and a source of profitability, and manage them accordingly. . . . Google insures on the mental and physiological health of their valuable, real assets, and gives them fair package and more freedom. . . . It is the developers. Therefore, these people are highly loyal to their workplace. And, I believe we should do the same. (B, Sen₃)**</td>
</tr>
</tbody>
</table>

* “I believe that the percent of individuals possessing the pioneer thinking is less than 10 percent”. (A, TM₃)

** There is something that should be mentioned with regard to the strong response of the acting director of the small bank B. Currently, there is a proposal for merging the small-size bank B in the huge-size bank A.
7.1.4.4 Job Rotation and Bundling Innovation

There is evidence found in bank C that job rotation is a source of bundling innovation that may lead to a phenomenal success. In 2003, one IT specialist (business wise) moved to the Investment Division. After several months, this specialist, with the cooperation of the investment banking teams of the bank and of a Professional Fund Manager, developed a new product which combines the features of an open-ended money market fund with the features of current account. The product name is Day by Day Account-EGP, known as “Youm b Youm Account-EGP”. The objective of the fund is to provide daily liquidity, preserve capital, and maximize returns. A current account is opened with a minimum amount of EGP 10,000, and the customers, individuals and corporations, receive a check book. Any deposit represents buying fund shares and any withdraw represents selling fund shares. The money deposited is invested in a liquid, low risk, and short term instruments, including Treasury Bills, Deposits, CBE Notes and other fixed income instruments. A daily return is calculated and credited to the customer account at 12:00PM. Less than one year later, ATM cards were issued to enable customers to check there balances, and deposit and withdraw money. An aggressive marketing campaign was launched through all the main types of media (e.g., TV, branches, and ATM machines). Also, the front-office employees played important role in promoting the product. The product is a phenomenal success, and is ranked as the largest money market fund in the Egyptian market, achieving sales of nearly EGP 24 billion (please note that the fund size at inception was only EGP 200 million). Because the fund size has exceeded the red limit identified by the regulations of the CBE, the bank has stopped selling new shares until the fund size getting below the limit. Thus, currently, there is no new subscription, and only daily redemption is allowed.

Discussion

The first finding shows that the internal selection process is effective and well established and takes into consideration the nature of innovation in the service context, being a non-separable activity. The second finding shows that the training system is very effective, being rich with three levels: (1) general training; (2) specialized and advanced training; and (3) R&D related training. The third type is of particular importance, and involves two critical elements: on-the job training; and apprenticeship. The fourth finding shows that job rotation is one of the main sources of knowledge integration and generation, despite the rare nature of bundling innovations derived from
job rotation in the cases studied. The third finding, however, shows that the component of rewards and promotions is not consistent with the nature of the innovation activities (e.g., creativity and risk), and with the success stories of the developers. It is true that the GDT of bank A was rewarded after the development of the credit policy. But, it is also true that several products were developed by the GDT and new units had been established to receive these products due to their high potential (please recall word table 9). Also, this component is not consistent with the effective training component in which valuable investment (money and time) is made.

The first finding is consistent with past research in service innovation. While Verona (1999) and Stringer (2000) argue that recruiting systems should seek to hire more creative and innovative people, who are at the cutting edge of their disciplines, past research in service innovation (e.g., Djellal, et al., 2003: 426; Miles, 2007) shows that innovation is a non-separable activity and full-time researchers are few in number. It is concluded, thus, that designing an effective process for internal selection is the main mechanism for recruiting entrepreneurial innovators in the banking sector. The second finding is also consistent with past innovation research, which shows that experience and creativity cannot be accumulated and maintained without a proper training. Leonard-Barton (1992) and Adler (1995) cite apprenticeship programs, including classroom education and on-the-job training as essential training mechanisms. The case study finding, however, seems to be more promising as it identifies three subsequent levels of training undertaken in the banking sector.

The fourth finding is also consistent with past innovation research. Several scholars (e.g., Grant, 1996; Kogut and Zander, 1992; McDermott and O’Connor, 2002; Nonaka, 2007) argue that job rotation is an essential source for knowledge creation and integration. Moreover, Leonard-Barton (1992) suggests this mechanism to mitigate the tension found among the members of cross-functional team. Also, Adler (1995) finds that job rotation is one pre-project effort used as inter-functional coordinating mechanism seeking to improve the integrative capability among the functions participated in the development activity. Furthermore, Sánchez and Pérez (2003) find that job rotation and the mobility of personnel between departments and sub-units within an organization is a stimulus to innovation. Moreover, Gallouj (2002) finds that staff transfers is a main flow in the knowledge base of the firm, leading to the creation
of appreciable elements of knowledge driving radical innovation, incremental innovation, and bundling innovation.

Past research also provides support for the third finding. Lengnick-Hall (1992), Drew (1995), and Souitaris (2002) argue that tailored rewards and extensive incentives, that match risks, should be designed as they are essential to foster intrapreneurship. It seems, however, that the lack of entrepreneurial retention through fair rewards and promising promotions has a universal nature. Leifer, et al. (2000: 168-170) state that “If big companies have trouble recruiting entrepreneurial, innovative people, they also have trouble retaining them”. They found that, despite the “perceived career risk”, most large firms do not design fair reward mechanism. These companies also do not convey a clear message that working in radical innovation projects is “safe”, and the career of entrepreneurs will not be put at risk. Despite this, they found that “radical innovators push ahead relying on intrinsic motivation. Their rewards came from their own sense of accomplishment tied to making progress in bringing something new, exciting, and valuable to the world”.

7.1.4.5 The Managerial Systems (Construct)

Based on the previous findings and discussions, managerial systems are conceptualized as a theoretical (second-order) construct manifested by four first-order latent factors as shown in figure 7.4.

![Figure 7.4: Managerial Systems as a Second-order Construct](image)

Source: Self.

Thus, financial institutions, seeking to develop effective managerial systems, need to design effective mechanisms to be able to accumulate the desired level of each first-order factor. As a theoretical (second-order) construct, the lack of one factor (especially
the entrepreneurial retention) will reduce the value would be extracted from the other factors.

### 7.1.5 Innovation-friendly Culture Construct

This section presents the findings and discussion related to the construct of innovation-friendly culture (the fifth dimension of the Core RIC). The findings suggest that there are four main values and norms that provide an innovation-friendly culture. These are: knowledge sharing and mutual support; and risk-taking and low in resistance to change. In other words, the findings suggest that the entrepreneur community is eager to share knowledge, provide support, take risk, and accept change. However, when this community seeks the support of, feedback from, or the approval of other parties in the organization, it faces difficulties due to the lack of these values and norms. The problem is exacerbated when the anti-entrepreneurial community is found everywhere, in several organizational levels and functions. The following is a presentation for each factor.

#### 7.1.5.1 Knowledge Sharing and Mutual Support

Knowledge sharing and mutual support among the community of entrepreneurs is found to be the norm and important to create new integrated solutions (new products). The GDT of banks A and B and contributors (executives and front-line staff) are cases in point. Outside this community, however, there is conflict in the findings. Some individuals pay attention to these values and norms, others do not pay any attention, and the others reject to adopt these values and norms. The following are the evidence regarding these three levels.

**Pay attention to the values of knowledge sharing and mutual support:**

| 39 | Our CEO has on-the-job experience regarding corporate banking but not regarding retail banking as this business is somewhat recent business in Egypt. However, he keeps saying that: I always would like to hear from you as you are updating my knowledge. . . . Also, he is very supportive. If we are going to make a small scale pilot project, he provides us with some customers who might be interested in the new product. . . . Do not forget that as a CEO he has a wide network of relationships with outsiders. (B, Sen$_3$) |

**Do not pay attention to the values of knowledge sharing and mutual support:**

| 40 | The new vice-chairman told us that his office is open for anyone who would have an idea. As developers appreciating new ideas and knowledge sharing, I and my colleague in the team [GDT] developed the idea bank and prepared a memo and submitted it to the new vice- |
The core of the idea bank was to create a new organizational position to be responsible for promoting knowledge sharing among individuals and also collecting new ideas from internal and external sources. It is very simple. It is a place and an organizational position. In this place, idea collectors and owners are gathered, so we can enlarge and enrich or portfolio of new ideas. This was followed by submitting memos for two new products. We did not get any response. Any response. Even, a thank you letter. My colleague quit. (A, TM1)

Reject to adopt the values of knowledge sharing and mutual support:

Well, many individuals prefer to keep their knowledge and not to share it. They think that if they would transfer their knowledge they will lose their source of excellence. We recognized the importance of innovation for our survival few years ago. So, we had tried to patron such people and change their attitude. This effort showed some success. But, some individuals had resisted, kept such belief, and preferred to isolate themselves. (A, Sen1)

As mentioned previously, some of the developers themselves do not belong to the entrepreneur community. They do not only lack the innovative thinking but also reject to share knowledge. They prefer the mutual adjustment pattern of knowledge integration. These are the implementers (mentioned in word table 12). The development manager of bank C noted that:

We do not need to attend the simulation scenario. The operational details of the product are articulated. Also, the test results are articulated. So, there is no need for interaction. Also, each one [the developer and the IT specialist] has a different box of knowledge. Also, we do not talk the same language. (C, Mid2)

7.1.5.2 Risk-taking and Low in Resistance to Change

The values and norms that encourage risk-taking and change play a critical role in the innovation competence of the firm. This is especially true with regard to radical innovation which bears a high level of risk and is associated with a great deal of change. Again, these components of culture are found among the community of entrepreneurs. The evidence, however, shows that there are many sub-cultures outside this community that avoid risk and resist change, although their approval are essential, and their feedback may be useful.

Risk-taker:

Our CEO is risk-taker. He is ready to discuss any new concept as soon as its proposal covers both risk and profitability. If the risk factors are well-identified and controlled, and the
Avoid risk and resist change:

After developing a new integrated solution, we seek the feedback of the relevant actors inside the bank. Here, the battle begins. When we send the product files to the legal people, we always get the following reply: No, no, this application is different from what we approved before. And when I inform these people that: Yes, it is a new application, and please review it, they keep sending the same reply. . . . We experience similar issues with the audit people who are uncomfortable with new procedures. . . . The risk people are another issue, and prefer always to add more guarantees and complicate the process. But, these new products may be new in everything: new in the process, and new in the risk. . . . If this community does not accept these new product models, innovators may be silent, or leave this community to another more innovative one. . . . Leave to another bank. (B, Sen3)

A board member always seeks the acceptance of legal people regarding any new concept that implies a high level of risk or requires a pilot project. But, these people are always conservative. Their feedback should come as late as possible. (B, TM1)

If we are going to enter a new line of business, resistance comes from board members who feel that the new business requires new skills and knowledge, or will reduce their power. But, in fact, learning new skills and acquiring new knowledge will increase the power. . . . I do not understand how we can survive the fierce competition with such thinking. . . . It was the champion job to deal with these people. He was also a board member. (A, Mid1)

A board member does not appreciate the addition of characteristics and see it as unnecessarily complicates our product portfolio and confuses our customers, front-line employees, and credit and sales people. Thus, any form of innovation that seeks to diversify our product portfolio is not appreciated. . . . He also does not appreciate the retail business and see it as complementary to the corporate business. . . . The last time I had to tell him that we had more than 10,000 totally new customers in the retail business, and none of these new customers had come through our corporate portfolio. . . . No way, I passed the matter to the retail head to deal with him. (B, Sen3)

We seek the feedback from some regional branch managers who are expected to receive the new products. Here, you need to be a good listener as you may get valuable feedback. But, also, you have to be ready for resistance. In many cases, we hear the following: Our customers will not like this . . . . We have two new products and we have not achieved the target yet. So why you throw this to me? In some cases, you have to be ready for fighting if someone takes off his watch and begins talking loudly. . . . I am not kidding. (C, Sen1)
Resistance also comes from other individuals (e.g., tellers and customer services) who might be affected by the change, especially if the innovation is around IT and implies the use of new IT application or even adding new features to the current IT system. The main reason cited is that individuals fear the failure that would associate the learning required to acquire the new skills.

**Discussion**

The findings show that there are two main sub-cultures with regard to major innovations: the entrepreneurial community and its supporters; and the non-entrepreneurial community. The former community is found to subscribe to a set of shared values and norms (sharing knowledge, providing support, taking risk, and accepting change), while the latter community does not subscribe to these values and norms. Two points deserve mentions regarding the previous findings. First, the evidence supporting these findings concerns public banks. Therefore, despite the different sizes of these public banks (bank A is huge, bank C is large, and bank B is small), it is understood that the values of dependency, authority, and stability are dominant among the non-entrepreneurial community of these banks. These values are developed naturally due to the long period of governmental protection. Second, as argued by Morris and Westbrook (1996), being banks exacerbates the battle between the two communities due the conservativeness dominating these financial services industry. Nevertheless, it is concluded from some quotes (especially word tables 41 and 46) that these public banks have come to realize that survival and growth is at risk due to the fierce competition, and thus the accumulation of the four dimensions of the innovation-friendly culture is essential.

The findings suggest that, when major innovation is considered, organizational culture needs to be open to change and provides an environment that fosters and sustains this type of innovation. More precisely, the findings suggest that organizational culture should promote the values, norms, and attitudes of: (1) knowledge sharing; (2) mutual support; (3) risk taking; and (4) low in resistance to change. These findings are consistent with past research. For example, Sethi et al. (2001) and Smith et al. (2005) find that a culture of risk taking is associated with a high degree of innovativeness. Harborne and Johne (2003) suggest that a culture of knowledge sharing is essential to create climate that promotes innovation. Moorman (1995) finds that a culture of mutual support and low resistance to change is associated with creativity and novelty. What
should be mentioned here is that, despite the importance of these cultural factors, their lack seems to be widespread. In other words, the lack of these cultural dimensions is not specific to the public banks studied. For example, Leifer, et al. (2000: 166) argue that “If corporate culture can be a positive force for innovation, it can also inhibit it”. In this respect, they studied 10 international corporations and found that radical innovators had been confronted with great resistance from the non-entrepreneurial community and its supporters. Moreover, knowledge sharing was found to be an issue.

7.1.5.3 The Innovation-friendly Culture (Construct)

Based on the previous findings and discussions, the innovation-friendly culture is conceptualized as a theoretical (second-order) construct manifested by four first-order latent factors, as shown in figure 7.5.

![Figure 7.5: Innovation-friendly Culture as a Second-order Construct](image)

Thus, financial institutions, pursuing major innovations, need to shape their organizational culture to promote the previous four unobservable factors. Again, these factors are not substitutes. They are complements, and intended to create positive culture. Hodge et al. (1996: 280) define positive and negative cultures through the way cultures affects goal attainment. “Culture can help push an organization toward its goals or away from them. It can either be consistent with organizational goals (a positive force) or it can be inconsistent with goals (a negative force)”. But, it should be noted that, as argued by Sørensen (2002) and Lyons et al. (2007), positive does not mean the uniformity of views and actions among the two communities and their supporters. Clash and disagreement is un-avoided in some cases, and required in others (as exploration is fostered though the existence of viable countercultures).
7.1.6 The Complementarity among the Five Constructs

On major principle of any core competence is that its underlying dimensions are complementary (interconnected and/or mutually reinforce each other) (e.g., Leonard-Barton, 1992; Madhavaram and Hunt, 2008). In this respect, the findings presented throughout this section provide support for the complementarity hypothesis. The following is a presentation for the complementarity among the five constructs.

Regarding the **R&D-IT complementarity**, the findings show that the R&D and IT capabilities are complements. For example, the experimental development is facilitated by the interaction between the developers and the IT specialists (word table 29). Also, advanced IT systems (Universal CORE banking) are embedded with many features that could provide the developers with new product characteristics (word table 26). Furthermore, the role of front-line employees as contributors is facilitated by the IT tools (e.g., internal website as shown in word table 21). In short, the R&D and IT capabilities are interconnected and mutually reinforce each other.

Regarding the **R&D/IT-Cooperative complementarity**, the findings show that establishing strategic (successful) relationships with germane partners and suppliers complements the R&D and IT capabilities. As shown in word table 31, these partners and suppliers fill the competence gap. This word table also shows that, in some innovation projects, the idea owner was a key partner (e.g., the EEAA) which took responsibility for a complete set of early innovation activities (e.g., undertaking market and economic studies and pilot projects). In other words, the findings show that collaboration is the norm in major innovations. Moreover, as shown in word table 23, partners and suppliers play a significant role when accumulating the potential absorptive capacity of the innovator bank. In short, building cooperative (networking) capability complements the R&D and IT capabilities of the radical innovator bank.

Regarding the **R&D-Managerial Systems complementarity**, the findings show that the managerial systems complement the R&D capability. The evidence is clear in that designing an effective mechanism for internal selection is critical to build the development team in the service context (word tables 32 and 33). Also, designing an effective mechanism for continuous training (especially the R&D related training, like on the job-training and apprenticeship programs as shown in word table 34) plays a critical role in accumulating and renewing the team capability. Moreover, designing an
effective mechanism for entrepreneurial retention (fair rewards and promising promotion) is essential to keep the innovators who are seen as the real source of market share and survival in the long run (word table 38). Word table 38 also shows that, without a proper mechanism for entrepreneurial retention, the innovators may leave the bank to more entrepreneurial environments (competitors). Taking into consideration the great investment made in continuously training these innovators (and also the low number of such innovators in the banking sector), the loss would be very costly. Finally, job rotation is found to be not only a source for bundling innovation (as presented in section 7.1.4.4), but also essential to accumulate the GDT dimension (as shown in word table 4, the members of the GDT had an experience in nearly all banking activities).

Regarding the **IT-Cooperative/Managerial Systems complementarity**, the findings show that both networking and managerial systems complement the IT capability. For example, the IT expertise is found to be an essential factor within the IT capability. In this respect, continuous technical training is found to be critical not only in accumulating this factor, but also in updating the stock of knowledge of IT specialists to keep pace with the high rate of technological innovations. Such type of technical training is *outsourced* to systems suppliers in many of the cases investigated (e.g., word table 24). Moreover, in major technological innovation, systems suppliers are involved in the development process to fill the competence gap (word table 31). Thus, establishing strategic relationships with these suppliers complements the IT capability. Moreover, being *business-led* (word table 29) suggests that *business training* is also important to increase the absorptive capacity of these IT specialists to be able to translate the business needs and concepts into competitive products through the technological medium (please recall the definition of the IT capability). Finally, fair rewards and promising promotion (entrepreneurial retention) would be critical for any entrepreneur (regardless of his/her profession, being R&D or IT related).

Regarding the **R&D/IT/Networking/Systems-Culture complementarity**, culture is the *organizational context* within which any organizational capability is accumulated (Harborne and Johne, 2003; Leonard-Barton, 1992). The findings show that the culture is said to be innovation-friendly if it promotes: (1) sharing knowledge; (2) providing support; (3) taking risk; and (4) accepting change. The findings also show that there are two main communities within the innovator bank: the entrepreneurial community and its supporters (e.g., the GDTs and contributors); and the anti-entrepreneurial community.
(e.g., the legal, audit, and risk people). While the former community subscribe to these four values and norms, the latter community does not pay attention and/or reject to adopt these values and norms. In this respect, it is important to discuss the strength of these values and norms. “The thickness or thinness of the culture is a measure of its strength”. In the former, culture is “widespread and accepted throughout the organization. Organizational members subscribe to a shared set of beliefs, values, and norms”. In the latter, culture is “not widely held and does not enjoy acceptance throughout the organization”. That is the organization lacks a core of commonly held beliefs, norms, and values (Hodge, et al., 1996: 273; Lyons, et al., 2007).

Here, as the organizational culture may be described as thick or thin, two issues need to be discussed. First, if these four values and norms are not found, the entrepreneurial community could not evolve, in a way that may impede the accumulation of the R&D capability. Second, if these four values and norms are thin (found but not widely dominant as shown in many of the cases studied), the entrepreneurial community could evolve, but also would flee, in a way that may weaken the R&D capability accumulated. That is because a battle is initiated (or even ignorance) each time a new product is developed, especially for really new and radical innovation products (e.g., word table 40 and 44). The organizational culture has an impact not only on the R&D capability, but also other strategic resources and capabilities. For example, the organizational culture that fosters the “not-invented-here attitude toward innovation” (Hodge, et al., 1996: 280; Verona, 1999), may have a negative impact on the collaboration efforts, and, as such, the accumulation of networking capability. Other strategic resources and capabilities also have a positive impact on the culture. Good training does not only increase the stock of skills and knowledge, but also change the culture (Herrmann, et al., 2006). Also, successful R&D projects which are the outputs of superior R&D capability may gradually change the culture.

The complementarities among the five strategic resources and capabilities (R&D, IT, networking, managerial systems, and innovation-friendly culture) call for conceptualizing the Core RIC as a superordinate construct. As argued by Leonard-Barton (1992: 122), core competence is “an interconnected set of knowledge collections—a tightly coupled system”. Figure 7.6 shows how the Core RIC is conceptualized as a superordinate construct.
Thus, financial institutions, seeking to build Core RIC, need to treat these five constructs as a system as the lack of one capability is expected to reduce the value would be extracted from other capabilities.
7.2 Entrepreneur (Resource Building) Capability

This section presents the findings and discussions related to the entrepreneur (resource building) capability. The findings suggest that there are three main factors underlying this capability. These are: (1) executives as capability patrons; (2) executives as shapers of culture; and (3) executives as engineers (architects). The following is a presentation for each factor.

7.2.1 A Network of Capability Patrons, Shapers of Cultures, and Engineers

7.2.1.1 Executives as Capability Patrons

It is concluded from the way by which the GDT capability of bank A built that the innovation thinking should be present as a quality in the TMT of the bank. The credit executive (and board member) had shown a great deal of desire and ambition to grow organically, vision, intention, and insistence to build the team capability, and also to conserve this capability from being deteriorated unintentionally by isolating them from any destructive forces. In the “first success story of the GDT” (setting the general credit policy of the bank), the way by which the team had been formed, then filtered, then led, then conserved by establishing the Credit Policy Department, then assigned the development responsibility all represents the evidence for such a conclusion. In other words, the senior executive has played the role of patron for the GDT capability to be accumulated.

While the case study findings show that bank A has built most of the factors underlying the R&D capability (team capability; proactive research capability; potential absorptive capacity), the findings show that bank C has built a superior IT capability (IT hardware and infrastructure; CORE banking solutions and other enabling software; and IT expertise). The following quote made by one technical engineer at bank C shows that building a superior IT capability requires patrons that are risk-takers and have the willingness to cannibalize existing technologies.

Technological capability is the second most important factor to compete within the financial services industry, and also to be innovative. But, the top management capability is the most
important factor. In late 1990s, the mainframe technology was still the backbone of our bank. All banks had been upgrading their systems except us. The Board of Directors at this time was risk-averse. It also lacked the vision. So, we had spent some time at the bottom of the Egyptian banking list . . . including all the public banks. It was disappointing to be the last one of the list after nearly 90 years of success, driving the Egyptian economy. Now, we have Universal CORE banking technology, the safest hardware and software for data encryption and security*, the most reliable backup center, the fastest ATM card in the Middle East, and 300 best-of-the-best IT engineers. And, we have been transferring our experience to the other public banks. . . . . The turning point was the new Board of Directors which was risk-taker. . . . As soon as this new board was charged, it had made several strategic decisions. Huge amounts had been invested. Also, it had taken years to upgrade the infrastructure, implement the system, shift the operations, and build the expertise. . . . As I told you, we had been changing the backbone. That is why I told you that the most important factor in your list of capabilities is the top management capability, followed by the technological capability. Without the former, there would not be the latter. (C, TM_1)

* Bank C has obtained the global Payment Card Industry Data Security Standard (PCI DSS) certification as the first bank in Egypt and North Africa compliant with requirements of PCI Data security standard, used by all major card brands as the common security standard for their compliance programs.

7.2.1.2 Executives as Shapers of Culture

The findings related to the innovation-friendly culture have shown that there are four dimensions of culture related to: sharing knowledge; providing support; taking risk; and accepting change. The findings also show that the anti-entrepreneurial community may not pay attention to these values and norms, and/or may reject to adopt them. This does create battle between the entrepreneurial community and the anti-entrepreneurial community in a way that inhibit the innovation activity. Thus, the ability to shape organizational culture to be innovation-friendly is suggested to be another factor underlying the entrepreneurial (resource building) capability. In this respect, a mechanism (the set of tools shown in word table 50) has been suggested to be followed by executives when shaping the organizational culture to be supportive (positive or innovation-friendly). In fact, some of these tools have shown some success in mitigating some of the negative impacts resulting from the lack of the four contents of innovation-friendly culture.

50 -Innovation is mentioned explicitly as a major theme in the mission statement of the bank. This has to include the kind of innovation trajectory followed . . . like the CDM-related projects. (A, Mid_1)
-Promoting the team culture . . . the team thinking and team working. (A, Sen_1)
-Good training to change these values and norms. (B, Sen_1)
A board member who is highly respected among his or her peers and has a political power adopts major development projects. (A, Mid₁)

The development team builds a strong project memo and relies on the power of persuasiveness. (A, TM₁)

Promoting the new product benefits to: the bank and its customers; and the employees themselves . . . like new experience and career development. (B, Sen₃)

Promoting the success stories of previous new products. (A, Mid₁)

Implementing the concept of idea bank to promote knowledge sharing among individuals. (A, TM₁)

Keeping an effective feedback system and showing that the new product ideas were the results of such system. . . . Even though the product idea might not be the output of such system.

Follow-up and stress the target to get the feeling that there is no way and resistance is a waste of time. (B, Sen₃)

Please note that all of these tools are classified as soft solutions except the last one.

### 7.2.1.3 Executives as Engineers (Architects)

As shown in figure 7.6, Core RIC is conceptualized as a superordinate theoretical (third-order) construct that is manifested by a set of complementary theoretical (second-order) dimensions. Being interconnected (and/or mutually reinforcing each other) calls for paying attention to all these second-order constructs as the accumulation of one capability (e.g., R&D capability) without giving an attention to its complements (e.g., managerial systems) may waive any advantage generated from this capability. Thus, while executives as capability patrons highlight the role of executives in accumulating and protecting individual capabilities, executives as engineers highlight the role of these executives in configuring and bundling these capabilities to produce a synergetic result. Furthermore, these five theoretical (second-order) constructs are manifested by a high number of lower-order factors (24 first-order latent factors as shown in figure 7.6). Thus, the competence network is said to be complex. This complexity creates causal ambiguity. This causal ambiguity may prevent the decision makers (executives) from making informed decisions regarding the accumulation process, and inconsistencies would appear. In other words, the TMT should develop a high level of causal understanding to the process by which this complex bundle of strategic resources and capabilities would be accumulated.

### Discussion

The first finding shows that one essential factor of the entrepreneurial (resource building) capability is executives as capability patrons, reflected by the following
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

indicators: desire and ambition to grow organically; vision: intention; insistence: project champion; protector (as shown in the case of bank A); risk taking; and the willingness to cannibalize (as shown in the case of bank C). Executives as patrons are found to be essential when building the R&D and IT capabilities. The second finding shows that another essential factor of the entrepreneurial (resource building) capability is executives as shapers of culture, which is required to shape the conservative organizational culture to be innovation friendly. It is suggested that this factor would be reflected by the nine-tool mechanism shown in word table 50. The third finding suggests that another essential factor of the entrepreneurial (resource building) capability is executives as engineers, which is reflected by the following indicators: the ability to configure; the ability to bundle; and the ability to decrease causal ambiguity.

The previous three findings are consistent with past research. Regarding the first finding, Penrose (1959), Lado, et al. (1992), and Verona (1999) theoretically argue that building capabilities that will enable the firm to compete on innovation, and may lead to the Schumpeterian creative destruction, is the responsibility of the causal actors (strategic managers and entrepreneurial executives) of the firm. In a similar vein, Davies and Brady (2000) find that building strategic capabilities follows a top-down approach. Moreover, Prahalad and Hamel (1990) and Hamel (1994: 32) assert that “protecting core competences from erosion takes continued vigilance on the part of top management”. Furthermore, Leifer, et al (2001) observe a system of patronage works in corporate innovation. In this system, a network of corporate executives is found to be responsible for building, nurturing, and protecting innovation-related capabilities. Regarding the second finding, Lado, et al. (1992) theoretically argue, and Leifer, et al (2001) Harborne and Johne (2003) empirically find that one of the executive's greatest contribution to radical innovation is to shape the organizational culture to be open to change, and to make these major change initiatives natural, accepted, and valued. Regarding the third finding, Makadok (2001) explicitly describe strategic managers as architects. Black and Boal (1994) theoretically argue that organizational capabilities should not be treated as distinct resources. Rather, they should be configured and bundled to produce synergetic results. Lengnick-Hall (1992) theoretically argue that one essential role of the strategic managers is to configure and bundle the capabilities for innovation. Finally, Sanchez (2008) theoretically argue that, and King and Zeithaml (2001) empirically find that, despite the complexity and tacitness of organizational competences, strategic managers of the superior performers understand well their core
competence, identify any gap (bottleneck) in the network (system) of this competence, and intervene to close this gap.

I will conclude the discussion by one important note. It is well recognized that a competence network cannot be called core unless it is executed consistently well, and thus institutionalized (e.g., Brush, et al., 2001; Day, 1994; Greene, et al., 1999; Nelson and Winter, 1982). Thus, past research suggests that a network of corporate executives should be participating in building core competences, which are complex in nature (Leifer, et al., 2001; Penrose, 1959). In this respect, the findings show that the Core RIC of bank A and C is not institutionalized and there are some inconsistencies. The reason may be that there is one or few numbers of corporate executives who perform the three essential roles of resource building capability (patrons, shapers of culture, and engineers). For example, it might be obvious that, in bank A, the roles of capability patron and shaper of culture had been performed by only one corporate executive. This may, in part, explain why some critical elements within the Core RIC are not consistent (e.g., being late in adopting the CORE banking technology, and the lack of entrepreneurial retention). Such contradiction may be explained by the old political system of the bank which shows that the innovation thinking was not buried in the TMT thinking. In other words, the entrepreneurial (resource building) capability had been an individual capability rather than TMT capability. The team manager and one team member noted that:

51 The directors in the old board kept their positions for a long period of time. So, some board members were powerful. Others were not. . . . The champion was the most powerful one. All of us [the employees] thought he would be the future chairman. Also, he was very knowledgeable and highly respected among his peers. So, when he had adopted any idea or project, the other had agreed. . . . Everything changed with the new Board of Directors. The champion was not in. (A, Mid₁)

52 No proper rewards. Very slow promotion in this place. And, now, no protector. All of us are frustrated. . . . The team members. (A, TM₂)

The problem is that a core competence can be easily eroded if this corporate executive retires or leaves the bank (Hamel, 1994). Moreover, although one individual could make a difference, s/he cannot make everything. In fact, the lack of a well institutionalized Core RIC reflects what Leifer, et al. (2000: 193) call “nascent radical
innovation competence” (instead of the “mature radical innovation competence”). In short, the findings suggest that the three roles of resource building capability should be performed by a network of corporate executives.

### 7.2.2 The Entrepreneurial Capability (Construct)

Based on the previous findings and discussions, the entrepreneurial (resource building) capability is conceptualized as a theoretical (second-order) construct manifested by three first-order latent factors, as shown in figure 7.7.

**Figure 7.7: Entrepreneurial Capability as a Second-order Construct**

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Second-order Construct

Entrepreneurial (Resource Building) CAP

First-order Factors

- Executives as Capability Patrons
- Executives as Shapers of Culture
- Executives as Engineers (Architects)
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Source: Self.

Thus, there should be a network of corporate executives to perform three essential roles required to build the Core RIC, and that these three roles are essential due to the complex, tacit, and dynamic nature of the Core RIC.

### 7.3 Summary

This chapter has presented the findings, discussions, and conceptualization of the core radical innovation competence (Core RIC) and entrepreneurial (resource building) capability. Core RIC is found to be a very complex resource, and thus conceptualized as a superordinate theoretical (third-order) construct manifested by five theoretical (second-order) dimensions (R&D capability; IT capability; cooperative (networking) capability; managerial systems; and innovation-friendly culture), which are manifested by 24 lower-order latent factors. On the other hand, the entrepreneurial (resource building) capability required to build the Core RIC is found to be a theoretical (second-order) construct manifested by three first-order latent factors (executives as capability patrons, as shapers of culture, and as engineers).
Chapter 7 Core RIC and Entrepreneurial (Resource Building) Capability (LI)

In Chapter 8, the findings, discussions, and conceptualizations of the project management capabilities will be presented. (Please note that all the research propositions will be developed in Chapter 10.)
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

The aim of this chapter is to present and discuss the findings related to the direction-incubation-acceleration capability framework of radical service innovation. The chapter is organized in five sections. Section one presents a process model for radical service innovation management. That is the chronological documentation of the phases and steps of a radical service innovation project at the national level, the National Program for Vehicle Replacement (NPVR), will be presented. These phases are: the direction phase; the incubation phase; and the acceleration phase. Section two presents the findings with regard to the taxi owner/driver experience participated in the acceleration phase. Section three discusses the process model through concluding a set of post-analysis findings. In section four, the capability framework of managing this radical service innovation project will be concluded, based on the findings presented in the previous sections. In section five, a summary will be provided.

8.1 A Process Model for Radical Service Innovation Project Management

In Chapter 2, I provided a snapshot for the RI project (the NPVR) by discussing the baseline context giving rise to the NPVR, several key aspects of the NPVR, and the impact of the NPVR on the baseline context (the benefits). In this section, however, I have to provide a chronological documentation (the temporal ordering of activities and steps) for this RI project. Here, although the RI investigated is a national program, in which many national and international actors have been participating, there will be an emphasis on the roles played by commercial banks. That is because one central aim of the current research project is to conclude the capabilities of managing RI project at the banking level. Table 8.1 lists the main phases (and steps) of the NPVR in addition to the actors participated in each phase.
8.1.1 The Direction Phase

The direction phase is the first phase of the NPVR. The key actor of this phase is the Egyptian Environmental Affairs Agency (EEAA), which is nationally conceived as the idea owner. The chronological documentation of this phase shows that there are four main steps. These are: (1) setting objectives; (2) idea generation; (3) opportunity recognition; and (4) recommendations. These four steps will be briefly discussed.

8.1.1.1 Setting Objectives

During 2001-2002, the Japanese International Cooperation Agency (JICA) with the cooperation of the National Institute for Transportation (NIT) conducted a study to develop the 2002-2022 Master Plan for reforming the transportation sector, known as
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

Cairo Regional Area Transportation Study (CREATS). Despite the environmental issues caused by the transportation sector and their dangerous impacts on public health, the study revealed other serious issues (Kfw-Entwicklungsbank, 2008). (Please recall that these issues were discussed in the baseline context, mostly in table 2.3.) JICA proposed five key strategies. JICA also proposed several solutions for issues identified under each strategy. Two solutions are of particular importance, as shown in the following quote. These two solutions show that the RI project started by setting two main objectives: improving the vehicle inspection system; and increasing the use of CNG.

While no specific reference was made to the replacement of the aged taxi and minibus fleets, the Master Plan did address the need to improve the vehicle inspection system. Furthermore, under environmental measures, it specifically recommended the increased use of CNG. (Kfw-Entwicklungsbank, 2008: 11)

8.1.1.2 Idea Generation

This section shows that how the replacement idea was generated although there was no specific reference for replacing the aging fleet of taxis and microbuses in the Master Plan (as shown in word table 1). During the period from 2002-2005, two main mechanisms had been developed to achieve the two objectives mentioned above. That is two pilot projects had been undertaken to develop effective mechanisms that would be replicated later all over Egypt. The EEAA played a key role in facilitating, monitoring, and implementing these two pilot projects. These pilot projects, however, failed due to a set of obstacles. (Please recall that these pilot projects and obstacles were discussed in table 2.8.) The EEAA suggested carrying out a feasibility study to identifying the potential environmental and economic benefits could be achieved by replacing the aging fleet of taxis and microbuses (manufactured before 1980) with new ones, run by the CNG (EEAA, 2007a). As mentioned previously, there was no specific reference to this idea (solution) in the 2002-2022 Master Plan. This shows that the replacement idea generated out of the results (obstacles) of several pilot projects that had no relation to the replacement idea itself.

8.1.1.3 Opportunity Recognition

Further studies were needed to analyze the baseline context and also to recognize the opportunity. The EEAA undertook a market (driver/owner) survey to identify the main characteristics of operations of taxis and microbuses in the GCR. (Please recall that the
results of this market survey were listed in table 2.7.) The EEAA also carried out a study to identify the economic and environmental benefits could be achieved from removing the aging fleet of taxis and microbuses operating in the GCR. This study showed that replacing the aging fleet of taxis and microbuses which were 25 years or older (as shown in table 2.5: 40,571 taxis and 13,114 microbuses) with new, more fuel-efficient models (run by CNG) would achieve: substantial saving in annual fuel consumption; substantial saving in annual subsidy; and great reduction in annual fleet emissions. This study also showed that the vehicle owner/driver would achieve substantial benefits (e.g., substantial reduction in fuel cost) if the old vehicle is replaced by a new, CNG fuel based vehicle (EEAA, 2007a). (Please recall the benefits of the NPVR listed in table 2.20, and also the NPV of several replacement scenarios calculated in table 2.17.)

8.1.1.4 Recommendations

The studies conducted by the EEAA showed that the baseline context was unsustainable (e.g., Kfw-Entwicklungsbank, 2008). In addition, the replacement idea had a great potential (benefits). Based on the previous, the EEAA recommended the initiation of a pilot project for vehicle replacement in the GCR. The purpose of this pilot project was to develop a replicable commercial replacement mechanism. Such a pilot project was essential to develop, test, and modify a replacement mechanism that would be replicated later to cover the aging fleet of taxis, microbuses, and buses all over Egypt (The World Bank, 2010a: 9). Two issues should be mentioned, as shown in the following quote. Taken together, these two issues would exacerbate the owners’ resistance toward replacing their old vehicles.

*Egypt has little experience of handling scrapped vehicles as old vehicles are repeatedly rebuilt and patched. The concept of “vehicle lifetime” does not really apply in this case*. (Kfw-Entwicklungsbank, 2008: 25)

*The limited ability of owners to pay the capital investment for a replacement vehicle*. (ESMAP, 2010: 4)

* Please recall that scraping and recycling, in addition to the supply of new vehicles were considered as obstacles for the replacement mechanism (as mentioned in table 2.10).

** Please note that it was recommended to replace 40,571 taxis and 13,114 microbuses. The average price of a taxi vehicle was EGP 55,000, and of a microbus was EGP 140,000. Thus, the replacement cost of this aging fleet of vehicles would be, on average, EGP 4,067.4 million (40,571 vehicles x EGP 55,000 + 13,114 vehicles x EGP 140,000).
8.1.2 The Incubation Phase

The incubation phase is the second phase of the NPVR. The key actors of this phase were: the EEAA; bank A; and the international bank Kfw. The chronological documentation of this phase shows that there are 12 main steps. These are: (1) assigning the new venture champion; (2) setting clear objectives; (3) team preparation; (4) studying similar projects; (5) concept creation; (6) process design and integration; (7) business analysis; (8) project authorization; (9) rapid implementation; (10) launch and review; (11) the way forward (solution and proposals); and (12) the identification of the managing entity. The following is a presentation for each step.

8.1.2.1 Assigning the New Venture Champion

Some members of the TMT of the EEAA (the Chief Executive Officer (CEO) and two senior executives) met with some members of the TMT of the bank (the Chairman, one Vice Chairman (VC), and the credit senior executive) to discuss the problem (the baseline context), show the economic and environmental study, and present the suggested solution, the idea of vehicle replacement. The bank showed an interest in the pilot project as the idea was consistent with the corporate social responsibility, a key statement in the bank’s mission. However, the bank showed a concern regarding the inclusion of microbuses in the pilot project due to the high default rate of the microbus finance product observed in the past, especially that the price of the new microbus was relatively high (the price of one microbus was nearly three times the price of one taxi), which implied a high risk as such. The EEAA agreed to proceed without the inclusion of the microbuses in the pilot project, especially that the records of the EEAA showed that very few microbuses had been converted to run by CNG which was a key element in the pilot project. The TMT in each key actor assigned a champion to form and lead the development team. In bank A, it was the credit senior executive (and board member) who played the role of champion, as usual. It is essential to list the personal characteristics of this project champion. Word Table 3 lists the main characteristics mentioned by the GDT of bank A.
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

Word Table 3: The Personal Characteristics of the Project Champion

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Quotation</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Maker</td>
<td>Senior executive and board member. Rule-breaker. (A, TM₁)</td>
<td>Incubator</td>
</tr>
<tr>
<td>Excellence</td>
<td>Long-term experience in his career [credit], in the place [the bank] and its pulse; PhD holder; and several apprenticeship visits in international banks. (A, Mid₁)</td>
<td></td>
</tr>
<tr>
<td>Multiple Roles</td>
<td>Be able to play all roles: champion, team leader, and, in some cases, team member. (A, TM₁)</td>
<td></td>
</tr>
<tr>
<td>Learner</td>
<td>Passion to learn something new, especially with regard to new businesses. (A, Mid₁)</td>
<td></td>
</tr>
<tr>
<td>Idea Driver</td>
<td>If we did not produce a good solution, he does not ridicule us . . . He presents its own solution in a question form: What about this [solution]? So, we have to think about his solution, and circulate it among us. And, at the end, you will feel that you are the idea owner, not him. (A, TM₁)</td>
<td></td>
</tr>
<tr>
<td>Motivator</td>
<td>Able to push you to your edge, by saying for example: -You are the best and only people to do this job, so forget all you think about, and let us do something wow. Understood. -In one day, you will sit in this place [his organizational position]. These words and others are said in a stormy way. This makes us hot, and we begin pressing each others. We also feel that we are highly appreciated, even psychologically. (A, TM₁)</td>
<td></td>
</tr>
<tr>
<td>Political Power</td>
<td>Has a political clout, and highly respected among his peers. (A, Mid₁)</td>
<td></td>
</tr>
<tr>
<td>Protectors</td>
<td>Support you especially in case of failure. (A, TM₁) Week proposals submitted to the board are his own responsibility as he did not see the full pictures. (A, Mid₁)</td>
<td></td>
</tr>
<tr>
<td>Comfortable with uncertainty</td>
<td>Calm and self-confident. (A, TM₂) Crisis manager and able to deal with surprises. (A, TM₂)</td>
<td></td>
</tr>
<tr>
<td>Visionary</td>
<td>If he believes that a shapeless idea is promising, then, it worth the effort to be given a shape. He is insightful, not reckless. (A, TM₂)</td>
<td></td>
</tr>
<tr>
<td>A very wide network of relationships</td>
<td>He is a window to the external world . . . a very wide network of relationships with the CEOs of many governmental bodies, financial institutions, corporations, etc. (A, Mid₁)</td>
<td>Integrator</td>
</tr>
</tbody>
</table>

Source: Self.

8.1.2.2 Setting Clear Objectives

A meeting between the champions of the EEAA and bank A resulted in setting a clear objective regarding the pilot project that should be conveyed to the development teams in each institution (EEAA, MOI, bank A). The objective formulated was:

> It is a national project for taxi replacement. We want, with the cooperation of the current and potential participants, to explore the implementation mechanism. (A, Sen₁)

8.1.2.3 Team Preparation

The champion passed the idea file to the GDT to be studied. Several informal communications (by phones) had been made between the team and its long-term
partner, the EEAA’s team, seeking answers for some highlighted quires. Then, the GDT was recalled by the champion, and the following message was conveyed:

As you saw, the raw idea is much like a piece of jelly. It is shapeless. . . . It is more like a dream. . . . More precisely, it lacks a practical implementation mechanism. So, you are going to explore the implementation mechanism with the cooperation of other partners. . . . Do not forget that you are going to build a ship*.

Building the ship concept is critical. In this concept, there must not be a leak. I mean that everyone on the ship knows and plays his role well, and all the roles are well integrated. . . . In other words, the clarity of roles assigned, the well integration, and the commitment, all play a critical role in such a highly complex process. So, this concept is not critical only because we are talking about financial products, but also we are talking about many related players in one value chain.

8.1.2.4 Studying Similar International Projects

Few meetings, then, had been taken place between the two development teams (EEAA and GDT of bank A), and they agreed to target all the issues identified in the previous studies related to the baseline context. However, as the replacement idea was the first of its kind in Egypt, the implementation mechanism was not stored in the experience base of this network (EEAA and bank A). Therefore, the teams agreed to study similar international experiences (other national programs for vehicle replacement), and this was the responsibility of the EEAA. The GDT manager stated that:

In general, studying similar international projects is very useful as they prevent us from reinventing the wheel. The relevant literature may be sufficient. . . . Visiting, inviting, or even hiring international bodies and consultants participated in these programs may be required. If these international experiences are seemed relevant to our case, they may be adopted. Or even modified. We may end with a completely different mechanism, but we have to find a start. If not, we will start from scratch and we have to prepare strong proposal for a pilot project.

With the cooperation of its international partners, including the Kfw interested in environmental issues, the EEAA was able to identify and study some scrappage programs implemented in other countries. A list of solutions and their relevance is presented in word table 7:

Recycling:
- Vehicle recycling is undertaken by specialized scrapping centers or vehicle manufacturers. (EEAA, 2008c: 3)
[Relevance:]
- There are no specialized centers for vehicle recycling in Egypt. There are only random junk
The teams, however, believed that the incentive package covered only part of the story. The concept of environmentally friendly products was not really conceived by many as a self-enforcement concept. This was particularly true regarding the targeted segment, due to the limited resources, and the long established attitudes and habits. As such, other components should be taken into consideration, especially enforcement.

### 8.1.2.5 Concept Creation (Formulation)

Since the vehicle replacement project was the first of its kind in Egypt, it was critical to identify the project components (the service concept, the final characteristics, or the core-supplementary solution combination) and the roles and responsibilities of each player regarding each component. One member of the GDT noted that:

> We [the teams of the bank, EEAA, MOI] had met several times to chart the project components based on: the issues identified in the pre-pilot project [related to the baseline context]; the results of studying the similar international scrapping programs; the experience base of each player; and the expected issues would arise. After several brainstorming sessions, the teams identified a list of the actual and expected issues, and developed four integrated project components covering these issues. . . . The project components were: enforcement; scrapping; tariff restructuring; and financial incentive package. . . . Whenever we found involving a new player to join us was justified we consulted the champion. . . . This step was the longest step in the Pilot Project. (A, TM₃)
Thus, there were four integrated project components related to: enforcement; scrapping; tariff; and financial incentives (as discussed in section 2.3). Based on these four integrated components, the roles and responsibilities of the related players were identified, as shown in table 8.2.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Key Roles and Responsibilities</th>
</tr>
</thead>
</table>
| **The EEAA (Project Coordinator)**                | - Place project advertising in traffic departments and units in the GCR;  
                                                | - Cooperate with other governmental bodies (e.g., the Governorates of the GCR) to devise a new fair, dynamic tariff structure (incentive);  
                                                | - Provide vehicle owners with a subsidy of EGP 10,000 in return for scrapping his vehicle (incentive); and  
                                                | - Manage comments and complaints from participants and conduct surveys.                                                                                                                                                    |
| **Vehicle Factories and Dealers (Two)**           | - Provide vehicles to eligible vehicle owners scrapping their old vehicles, at a somewhat discounted price on certain models (incentive);  
                                                | - Enable a gas company to undertake the CNG post-production installation;  
                                                | - Prepare vehicles for mass transport use (e.g., install the air conditioning, the new tariff meter, taxi sign, car-friendly environment logo, and paint exteriors (B&W));  
                                                | - Provide up-to 3-year warranty on vehicles;  
                                                | - Provide routine maintenance and the spare parts;  
                                                | - Notify the bank if the vehicle owner did not perform the routine maintenance (enforcement); and  
                                                | - In case of loan default, repossess the vehicle, pays the outstanding loan to the bank, and resell the vehicle to another taxi buyer (enforcement). |
| **A Gas Company**                                 | - Convert the petrol vehicle to run on CNG, at a discounted price (incentive).                                                                                                                                                       |
| **The Commercial Bank A**                         | - Provide loans to eligible vehicle owners who have surrendered their old vehicles, at favorable terms (incentive); and  
                                                | - Notify the MOI if the borrower had not paid two (monthly) subsequent installments, or did not perform the routine maintenance (enforcement).                                                                              |
| **The Insurance Company**                         | - Provide comprehensive, all-risk (causalities and life), portfolio insurance for all replacement vehicles, at a discounted premium (incentive).                                                                                     |
| **The MOI**                                       | - Perform the scrapping operations;  
                                                | - Manage licensing and registration of new vehicles, at discounted fees (incentive);  
                                                | - Enforce the use of the meters installed (enforcement);  
                                                | - Locate vehicles in case of loan default and violating the periodic maintenance agreement (enforcement).                                                                                                             |
| **The Vehicle Owner (Activity Implementer)**      | - Follow the process (replacement mechanism);  
                                                | - Pay 25 percent of the new vehicle price (after deducting the EGP 10,000); and  
                                                | - Be committed to all the terms of the mechanism (loan installments, routine maintenance, and the use of meters).                                                                                               |

Source: Compiled from several documents and interviews.

Two points need to be mentioned regarding the step of concept creation. First, one important decision had to be made in this step was: the number of taxis would be involved in the pilot project. This decision had an important implication for all participants, especially the bank providing the finance, and the EEAA providing the subsidy. The champion of the GTD and the champion of the EEAA’s team believed that including 1,000 taxis in the pilot project would be reasonable for testing the implementation mechanism, and also for encouraging the other players to participate in the project and add to the incentive package. The champions also believed that a
subsidy of EGP 10,000 for each taxi would encourage the taxi owner to participate in the project. The champion of bank A provided the following explanation:

Well, the limited subsidy available for the pilot project and the high market value for the old taxis had to be taken into consideration. The money allocated from the Environmental Protection Fund for this pilot project was EGP 10 million. But, the market value for the old taxi vehicles was boomed after restricting the number of taxis in the Greater Cairo Region. . . . For example, a taxi vehicle with a market value of EGP 15,000 had increased to about EGP 33,000. So, the taxi plate alone had a market value of EGP 18,000. OK, the taxi owner would keep the plate. So, we believed that giving EGP 10,000 as a subsidy for an old vehicle with a market value of EGP 15,000 would be fair. He could, then, sell his vehicle as a scrap for any junk workshop. More than EGP 10,000 was believed to be extravagant, and less than this was believed to be disappointing. Hence, the number of 1,000 taxis [EGP 10 million / EGP 10,000]. . . . Yes, the number of 1000 taxi vehicles was believed to be OK for such a pilot project (A, Sen1).

Second, the bank was responsible for joining and negotiating the auto dealers. Two auto dealers were chosen to provide a reasonable variety of vehicle models. The bank also was responsible for joining an insurance agency. These three new players, however, were chosen based on previous successful working relationships. The GDT manager noted that:

- To insure a high level of commitment, we involved the players with which we had established successful relationships. . . . Well, the established mechanism for our auto loan product included two key partners: an insurance agency, and some auto dealers. . . . The auto dealers are responsible for managing the relationship with their partner. . . . the MOI.
- The four models were suggested by the two auto dealers. . . . They believed that these models would satisfy the preferences of the lower-lower and upper-lower segments that would emerge. (A, Mid1)

8.1.2.6 Preliminary Process Design and Integration

Based on the roles and responsibilities identified in the previous step, each participant modified or developed its internal process, and prepared a very basic manual, including the main process steps. Then, the teams (EEAA, MOI, bank A, and the two auto dealers) met to present the main steps in each internal process, and integrate these processes. This step, however, required several meetings and amendments to fine-tune the whole workflow. This involved further modification to the internal processes previously developed. One team member stated that:

We [EEAA, MOI, the bank, and the two auto dealers] were like a team of carpenters trying to trim and mesh different, separated wooden structures designed to satisfy the new roles and
Responsibilities of these carpenters. So it took some time and several trials. Each team of the four teams was required to prepare and present its view of the process looping. So, we started by four different process designs, and ended with the most relevant one . . . from the point view of all the four teams. So, the integration process required multiple brainstorming sessions with several filtrations. . . . Yes, the process of auto loan product was well established. But, we made changes to the process itself. Also, new players were involved. Also, the whole workflow was complex. So, we had to develop a clear, strict workflow to be followed by the taxi owners. . . . Because we recognized that these taxi owners lack the experience and knowledge. . . . When you are going to change habits and attitudes, be very clear (A, TM,)

Table 8.3 summarizes the process tasks from the perspective of the vehicle owner.

**Table 8.3: The Process Tasks from the Perspective of the Vehicle Owner**

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. The EEAA (1): Marketing and “No Objection Letter”</strong></td>
<td>The taxi owner approached the EEAA to receive information about the scheme, upon which s/he could make an informed decision regarding the participation in the project and new vehicle choice. This information included, for example: list of prices and models of eligible vehicles; contact information for the participating vehicle dealers; pricing sheet for maintenance and spare parts; and loan requirements (including the net down-payment, the difference between the 25 percent and the EGP 10,000 subsidy). The role of the EEAA was not only to inform the eligible owners, but also to influence and persuade them (using the incentive package, and the benefits of running a new rather than an old vehicle). The owner who agreed to participate and was able to pay the net down-payment was issued “No Objection Letter”.</td>
</tr>
<tr>
<td><strong>2. The Bank (1): Application for the Bank Loan</strong></td>
<td>The owner, who agreed to participate, approached bank A to complete a loan application form and sign an authorization for a credit rating check. Upon completion of a positive credit rating check, the owner was expected to submit the required documentation to the bank, and the bank opened a current account on behalf of the owner in which the net down-payment was deposited. The following procedures included: issuing a preliminary loan approval letter by the bank; singing loan and insurance contracts by the vehicle owner; and signing a promissory notes for the vehicle and insurance loan by the owner. (It should be noted the insurance premium was paid on annual basis by the bank to the insurance company. This premium was divided into monthly installments, which were part of the monthly loan installment paid by the vehicle owner. However, this was an internal process executed by the bank. From the perspective of the vehicle owner; there was only one loan.)</td>
</tr>
<tr>
<td><strong>3. The Vehicle Dealers (1): Designation of New Vehicles</strong></td>
<td>The vehicle owner visited one of the two participating vehicle dealers and submitted the preliminary loan approval letter from the bank. The owner then requested a new vehicle, and the vehicle dealer reserved a vehicle for the owner by designating/specifying the new vehicle’s chassis and engine number. By specifying the engine and chassis number, the vehicle dealer was obligated to have this specific car manufactured and ready to be delivered to the owner within a reasonable timeframe. When the vehicle was ready for delivery, the vehicle dealer contacted the vehicle owner and issued “New Vehicle Designation Letter”, which specified the new vehicle’s chassis number, engine number, model, etc.</td>
</tr>
<tr>
<td><strong>4. The MOI (1): Inspecting and Scrapping the Old Vehicle</strong></td>
<td>The owners brought their vehicles to the Traffic Department (MOI) where a technical engineer conducted a vehicle inspection (the inspection criteria included: the vehicle was legally licensed and registered; the vehicle’s original chassis and engine serial numbers were intact; and the vehicle was operational). Upon successful completion of inspection, the vehicle license is cancelled. In return, the owner received an “Inspection Report” and “Scrapping Certificate”. (The owner could, then, sell the vehicle to any junk workshop to be recycled as spare parts and scrap.)</td>
</tr>
<tr>
<td><strong>5. The EEAA (2): Issuing the Subsidy Check</strong></td>
<td>After completion of vehicle surrender, the owner submitted the so far produced documents to the EEAA in exchange for the subsidy check.</td>
</tr>
<tr>
<td><strong>6. The Bank (2): Bank Loan Final Approval</strong></td>
<td>Upon receipt of the subsidy check from the EEAA, the vehicle owner returned to the bank to deposit the check in his or her current account. After singing an official general power of attorney for the vehicle, with the bank as the beneficiary, the owner obtained the “Final Loan Approval Letter”.</td>
</tr>
<tr>
<td><strong>7. The Vehicle Dealers (2): Receipt of New Vehicle and Preparing the License Package</strong></td>
<td>The vehicle owner submitted the “Final Loan Approval Letter” to the vehicle dealer. In return, the vehicle dealer issued the driver a “Receipt for Purchase of New Vehicle”. The dealer received payment from the vehicle owner for compulsory insurance (in accordance with national law) and license tax, and prepared the corresponding receipts. The vehicle dealer also was responsible for assisting the owners in the licensing process: preparing the required documentation (e.g., Certificate for Meter) on behalf of the owner; and submitting the package to the MOI for licensing.</td>
</tr>
<tr>
<td><strong>8. The MOI (2): Vehicle License and Registration</strong></td>
<td>Upon receipt and review of these materials, a new vehicle license was issued by the Traffic Department and given to the owner. With all paperwork in order, the vehicle owner was given her/his new taxi vehicle.</td>
</tr>
</tbody>
</table>

Source: Compiled from different sources and interviews.

**8.1.2.7 Business Analysis (Evaluation Preparation)**

The GDT team of the bank was required to prepare a memo for the pilot project. In the current project, the memo included: (1) an introduction; (2) the roles and
responsibilities of all participants; (3) the workflow; (4) strengths-weaknesses-opportunities-threats (SWOT) analysis (and how the W and T were mitigated and controlled); (5) profitability analysis; (6) sensitivity analysis and stressing test; and (7) recommendations.

Introduction, Roles and Responsibilities, and Workflow

The introduction included: a statement about the problem and its environmental, economic, and social impact; the evolutionary nature of the replacement idea; the meetings and brainstorming sessions conducted, and the need for extra effort to develop and test a replacement mechanism, and to explore the technical and market aspects of this mechanism. The roles and responsibilities of all participants and the workflow were also presented in the memo as shown in the third and fourth steps above.

SWOT Analysis

The SWOT analysis is shown in word table 12.

Word Table 12: The SWOT Analysis of Bank A

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Customer trust (due to the long history and reputation); -The largest cliental base in Egypt; -The concept of corporate social responsibility is well established; -Wide network of branches; -The car loan product is well established; -Strong network of relationships with all the players (except the MOI).</td>
<td>-Staff resistance; -Inefficient IT system.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Targeting under bankable segment (new window for finance); -Financially low risk project; -Environmentally, economically, and socially beneficial project; -Governmental support for the project.</td>
<td>-New partners may violate the agreement; -Customer compliance with terms.</td>
</tr>
</tbody>
</table>

Source: (A, TM), after reviewing the original internal document.

Profitability Analysis

The profitability (per case) is calculated as follows: Pricing (%) – Cost (%) – Provision (%). The cost includes both the cost of fund and indirect costs, like wages. Regarding the pricing and provision, the pricing for the current auto loan product was 15.5% (equivalent to an advertised 9% cut interest rate). The GDT assumed that a reduction of 1.25% cut interest rate from the normal cut interest rate advertised would stimulate the
new segment to participate in the project. Thus, 7.75% would be acceptable, taking into consideration that the reduction in fuel consumption and other cost would be sufficient to cover the monthly repayments, and, thus, reduce the default rate. The quarterly profitability projection, on the other hand, was based on the quarterly sales. The logic behind the projection was articulated by one team member as shown below:

| 13 | Well, we had 1,000 vehicles. The quarterly sales were based on the following assumption: 10 percent [100 vehicles] in the first quarter; 20 percent [200 vehicles] in the second quarter; 30 percent [300 vehicles] in the third quarter; and 40 percent [400 vehicles] in the fourth quarter. . . This assumption was based on that early adopters, which estimated to be 10 percent, would lead the market by the word-of-mouth which had a great impact on the adoption rate in the Egyptian market. . . Regarding the 10 percent? . . . It was based on our records with regard to totally new financial products. (A, TMš) |

**Sensitivity Analysis and Stressing Test**

Two forms of tests were used to identify the “stop loss” limit. These were: sensitivity analysis and stressing test. The former was used to identify the *stop loss in terms of interest rate at which the project would breakeven*. A simulation test is performed using different interest rates (e.g., increasing the cost of funds and/or reducing the price). This tool is important because a large part of the profitability in the banking industry is based on maturity mismatching. The latter test is used to identify the *stop loss in terms of the number of non-performing cases at which the project would breakeven*. In the current project, 40 cases (out of the 1,000 cases) were identified as stop loss limit. In other words, if the actual number of non-performing cases reached 40 cases, the project should be stopped, and no new loans would be provided.

**Recommendation**

At the end of the memo, the GDT team presented its recommendation in a compelling and attractive manner. The champion played an important role in this regard. A draft of the memo was prepared and presented to the champion, and several modifications were made.

**8.1.2.8 Project Authorization**

It is important to list the difference between the incremental and radical mode. The GDT manager made the following comment:

| 14 | *In incremental innovation, the product has history, and there are internal forces and/or external forces to modify or develop its characteristics and/or implementation mechanism [*the |
Three steps are observed when the decision makers (the Board of Directors or the related committee) have a critical, constructive thinking. These are:

- They must grasp the concept and be convinced about its benefits;
- They may have inquiries regarding the assumptions based on which the memo [proposal] is built, and the risk factors identified and how they are controlled;
- They may be motivated to improve the implementation mechanism, or discover any leak in this mechanism . . . a neglected risk factor, weakness, or threat.
- They should be risk-takers (A, TM₁)

In the current project, there was only one objection from the executive of corporate banking division (and also a board member):

Why we get in this project and deal with 1,000 customers with all of their problems? And, the addition to our portfolio [expected to be EGP 37-48 million] is nothing. One corporate customer with EGP 1 billion addition to our portfolio is a piece of cake. (A, TM₂)

In addition to the memo presented before the Board of Directors Session, the PowerPoint presentation presented by two members in the GDT also played an important role. The following points may be seen as the key in the persuasiveness component of this presentation:

- It is a pilot project.
- It is a national project which is consistent with one statement in the bank’s mission: corporate social responsibility.
- If the project succeeds, then, it will be wow. If it fails, then, we will know the reason, and we might be able to solve or neutralize it. It is pilot project, and we are going to learn something new.
- The enforcement component takes into consideration the issue of creditworthiness of this
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

After answering all the broad members’ notes and objection in the same session, the participation in the pilot project was approved, according to the assumptions made and the framework developed.

8.1.2.9 Rapid Implementation (Rapid Prototyping)

This step represented the physical implementation of the roles and responsibilities of all the related players (as shown in table 8.2). Regarding bank A, very few numbers of branches had been identified to launch the product during the pilot project (one branch at the north of the GCR, and another one at the south of the GCR). Both the front-office operations (e.g., providing information about the loan, and receiving the required documents), and the back-office operations (e.g., investigating the application: I-Score and telephone investigation; and authorizing or rejecting the application based on the investigation result) were translated into a periodical-like and sent to these two branches. Then, after authorizing the loan amount, the taxi owner was allowed to deposit the monthly repayments in any branch of the network of branches. The GDT team was assumed a supervisory role. Managing the product in such a way had three main advantages articulated by the GDT manager.

- It eliminated the training required, and, as such, the resistance expected;
- It eliminated the need for an advanced IT system required to follow the product performance;
- It would enable us [the GDT] to closely and continuously monitor the process with the two teams [at the two branches] during the launch step which was seen as critical to make any modification to the procedures. It also was critical to accumulate learning about this segment.

So, the process was designed to make the best use of the current resources. Minimizing the cost of participation in the pilot project as much as possible was seen as important factor to make the product more attractive to all stakeholders, including the taxi owners and the Board of Directors of the bank. . . . Any increase in the cost would be paid by the taxi owner. Also, any investment in IT software or training would be rejected from the Board of Directors. . . . It is a pilot project, so reduce the cost as much as you can. (A, Mid)
On the network level, bank A prepared and sent the loan tables to the EEAA; the two auto dealers prepared and sent a list of the vehicle models and prices to the EEAA; and the EEAA designed the content of the simple stickers (media campaign), and applied them in the traffic departments.

### 8.1.2.10 Launch and Review (Live Experimenting)

In November 2007, the product was launched. During the launch step, about 3,800 taxi owners showed an interest to receive information regarding the project. 1,600 taxi owners had decided to participate in the 1000-pilot project, and the EEAA was keen to survey the non-participants regarding why they did not take part in the project. 1,000 taxis were chosen (according to the vehicle age), and a waiting list had been created for the rest. Due to the high unanticipated response rate, the actors decided to group applications in lists and move these lists along the process. One member of the GDT noted that:

> The grouping idea deemed useful in reducing the time and cost of operations, and also to test the notion of mass production. The size of grouping list, however, was flexible (e.g., a list of 10 applications, a list of 50 application, etc.), and the EEAA was monitoring the queue along all actors to take into consideration any bottlenecks, especially at the auto dealers. . . . Moving applications in lists instead of case-by-case was seen as the main change in the launch and review step. (A, TM) 

The key feature characterizing the launch and review step was the close and continuous monitoring provided by all the participants in the value chain, mainly to: (1) validate assumptions; (2) test the implementation mechanism and know the market reaction; (3) explore the possible issues; (4) cultivate trust, especially with regard to new relationships (the bank-MOI; taxi owner-auto dealers); and (5) suggest adequate solutions that would provide a sound basis for a further phase (acceleration). The following quotes are important in this regard:

> In pilot projects, you should go to the market with open eyes to be able to monitor the sound of the market, and test your assumptions. This is very important, especially when your customers lack the ability to articulate their experiences. Although the implementation mechanism was based on the results of the feasibility study conducted by the EEAA, it also was based on many assumptions. Some of these assumptions were based on the reality of each actor. Others were generated from the brainstorming sessions. Each actor was in need to test its assumptions in the reality, the client’s world. Also, we were in need to test the capabilities and commitment of the new player with regard to the implementation mechanism. (A, Mid)
We went live with open eyes, continuous monitoring, and open communications. Each participant was responsible for monitoring its process, and its client encounter, and reporting to the EEAA. We realized that the client feedback might not be sufficient. He might not be able to articulate his experience with the whole series of encounters. So, it was our responsibility. (A, Sen₁)

The board member [of bank A] was the champion, the leader, and a team member. He was following the project on an ongoing basis: the number of applications received, the number of applications authorized, any problems and feedback regarding our operations and the operations of the partners, and any surprises. It [the project] was like his new baby who needs close and continuous monitoring. (A, TM₁)

We depended heavily on the word of mouth . . . the chain of reaction among not only the community of taxi owners and drivers, but also the passengers. So, we had tried to follow both. (EEAA, Sen₁)

In March 2008, after nearly 5 months from the launch, there were more than 500 applications had been fully processed leading to new taxis on the road, and the rest of applications were partially processed. The first formal project review was conducted by the EEAA and Kfw, which included: (1) feedback from a sample of the participant taxi owners in addition to some passengers used the new service; (2) the feedback had been reported by the other actors participated; and (3) the feedback from some of the non-participant taxi owners who received the information but did not participate in the project. Four main issues had been identified. These were: (1) bureaucracy; (2) hardship; (3) publicity; and (4) visibility.

### Bureaucracy

There is a belief among most of the taxi owners participating in the project that the process is long and bureaucratic. They must pass through numerous stages before getting their new taxis on the road. They must, thus, visit several different organizations over a period of time. In this context, the issue of bureaucracy has financial implications for the owners if they will be without a vehicle for several weeks and thus unable to earn any income.

### Hardship

There is a risk that some taxi owners might be put out of business because of their inability to raise sufficient capital or meet the necessary conditions. . . . For example, many drivers complained that the down-payment for the new vehicle was an obstacle to participate in the project. Others complained that they were unable to secure a loan due to age. (Kfw-Entwicklungsbank, 2008)

Many of the participants cited the inability to meet the monthly repayments. (EEAA, 2008c)

Most of taxi owners participated had to sell their old vehicles for the random junk workshops at very low prices. (EEAA, 2008b)

### Publicity
There was a lack of publicity with regard to the replacement project. Taxi drivers were only aware of the program through information passed by word of mouth among themselves.

**Visibility**

The 1,000 new taxi vehicles were painted B&W [as shown in photo 8.1] and indistinguishable visually from other B&W taxis on the street, thus missing an opportunity to inform about the project and to advertise to the wider public that action was being taken against an environmental issue. (Kfw-Entwicklungsbank, 2008)

### 8.1.2.11 The Way Forward (Solutions and Proposals)

The way forward step included two parallel efforts to chart the recommendations that would base the next phase of the program (acceleration). The former was related to generating solutions regarding the issues identified in the launch and review step. The latter was related to developing the way forward proposal addressing the weaknesses and threats that might arise when implementing the replacement concept on a much wider scale. In this regard, several brainstorming sessions were conducted among several actors, including the Kfw. It should be noted, however, that the way forward step started before fully processing the 1,000 taxis. There was a belief among the related players that the pilot project was successful, and they had to continuously thinking about the next phase by synthesizing and crystallizing the leaning accumulated from the current phase, and developing the proposal targeting the next phase of the project. One member of the GDT noted that:

> As soon as you feel that the current step would be a success, you could not wait until the end of this step. You begin thinking about the next one. . . . The worry makes you work in several worlds of thoughts. And, I believe that this is the case for radically new products. Also, we were still hot. So why we shut our thinking, wait, and, then, reinitiate it. (A, TM3)

#### Solutions Generated

Four main solutions had been generated to overcome the four main issues identified in the launch and review step (as shown below).

**Bureaucracy: One-Stop-Shop**

Procedures of the current implementation were disparate and disincetive to participation. As such, consideration should be given to coordinating overall administration into a “One-Stop Shop” the objective of which would be to speed up and streamline the procedure (Kfw-Entwicklungsbank, 2008).
Hardship: Layers of Financial Incentives

The next phase would represent a move from a program in which taxi owners participated through choice, to one in which they obligated to participate. Bearing in mind that the current over-subscription of the pilot project was a result of those who were able to participate coming forward (rather than those who were obliged to, as will be the case in the future), any incentives and subsidies, therefore, should be designed to address issues of hardship and need that might arise. In other words, the program must not be seen as heavy handed or inequitable. If too many onerous conditions were placed on taxi owners, there was a risk of alienation leading to a lack of cooperation. It might therefore be necessary to offer arrays of incentives to encourage the replacement of old vehicles (Kfw-Entwicklungsbank, 2008). In this context, the following list was generated:

- To pay a subsidy of EGP 10,000 for each taxi owner and EGP 15,000 for each microbus.
- To exempt customs on imported components of the vehicle.
- To make an agreement with the auto dealers to offer a special discount. (EEAA, 2008c)
- To make an agreement with several commercial banks to offer loans with more favorable terms, e.g., lower interest rate, 90 percent loan with repayments over a longer term. (Kfw-Entwicklungsbank, 2008)

Publicity: National Media Campaign

Publicity about the program should be twofold: (1) to explain the reasons for and importance of the program to taxi owners; and (2) to broaden awareness of the program and set out the procedures involved (EEAA, 2008c; Kfw-Entwicklungsbank, 2008). In this context, a national media campaign should be initiated to encourage and inform the owners of the aging fleet of taxis and microbuses to participate in the national program.

Visibility: White Taxi instead of W&B Taxi

The car-friendly environmental logo installed on the replaced vehicles was not enough to inform the public about the project and its objectives (Kfw-Entwicklungsbank, 2008). In this respect, one auto dealer suggested that it would be painted white with an additional white and black sticker identifying them as taxis (as shown in Appendix A.1), instead of the traditional B&W color. This suggestion was accepted by all the related players especially that it would add to the cost reduction (one color instead of two colors).
The Way Forward Proposals

Two proposals had been prepared by the EEAA and Kfw. These proposals addressed the weaknesses and threats that might not be necessarily inherent in the concept of pilot project, but would have a negative impact on the acceleration phase. These weaknesses and threats were related to: supply of vehicles; scrapping and recycling, and full enforcement; inspection and maintenance; and Program of Activities (PoAs). Several valuable recommendations also had been generated to overcome these weaknesses and threats.

Supply of Vehicles (An Obstacle)

One threat related to the ready supply of suitable new vehicles that the program must not proceed faster than new vehicles could be made available. In other words, if a large number of vehicles were to be replaced in a short period of time, supply of new vehicles might become an issue. (Please note that locally assembled models are to be preferred by the Egyptian Government to support local industry, minimize costs, and reduce exposure to taxes (Kfw-Entwicklungsbank, 2008).) It would be necessary, therefore, to stratify the fleet so that the number of vehicles that would be replaced each year would not exceed the available resources (EEAA, 2008c; Kfw-Entwicklungsbank, 2008).

Under the EEAA and Kfw proposals, the aging fleet of taxis and microbuses produced before 1980 would be replaced over three years (as shown below).

<table>
<thead>
<tr>
<th>Year</th>
<th>Vehicles to Be Replaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-1989</td>
<td>20,000</td>
</tr>
<tr>
<td>1990-1999</td>
<td>13,500</td>
</tr>
<tr>
<td>2000-2001</td>
<td>4,500</td>
</tr>
</tbody>
</table>

In short, it is suggested to launch a 3-year national program. During this period, 13,500 taxi vehicles and 4,500 microbus vehicles would be replaced each year. (EEAA, 2008c: 5)

Scraping and Recycling (An Obstacle) & Full Enforcement

There was a fear that some of the replaced vehicles (or their polluting components) might appear elsewhere in the world, or the scrapping and recycling operations might not be environmentally sound (especially that recycling was undertaken by random,
unspecialized junk workshops). Therefore, scrapping and recycling of old vehicles must be enforceable and verifiable, and environmentally safe. To overcome such obstacle, the following was suggested: (1) to assign a dedicated scrap-yard (or scrap-yards); and (2) to construct specialized recycling facility or facilities (Kfw-Entwicklungsbank, 2008).

Regarding enforcement, the EEAA suggested the issuance of a formal Decree by the Minister of Interior to ban the renewal of license for the pre-1980 manufactured taxis and microbuses, as of 2011 (EEAA, 2008c).

**Inspection & Maintenance (An Obstacle)**

The enforcement of technical and emission standards was seen as an integral component in the next phase of the project (Kfw-Entwicklungsbank, 2008). Moreover, there was a lack of specialized centers responsible for diagnosing and repairing the environmentally related problems for the vehicles failing the VET (As shown in table 2.8). In this context, the EEAA suggested that the private sector could participate through: (1) establishing integrated stations for conducting the environmental and technical examination of the vehicles; (2) diagnosing and repairing the faults; and (3) issuing an examination certificate (EEAA, 2008a).

**Program of Activities (PoAs)**

As discussed in tables 2.10 and 2.11, the Clean Development Mechanism (CDM), or more specifically the Program of Activities (PoAs)), is a central component in the NPVR. To ensure that the program’s social and environmental objectives would be met, it was suggested that the program should be structured as a bundle of replicable projects, and registered as CDM-PoAs (The World Bank, 2010a). The challenge, however, was that which institution (or actor) would play the role of the managing entity.

**8.1.2.12 The Identification of the Managing Entity**

As discussed in table 2.11, the PoA provides the organizational, financial and methodological framework for the emission reductions, which should be managed or coordinated by a public or (national or international) private entity. The Managing Entity is the project participant which provides the framework and incentives for others to achieve the emission reductions (Fenhann and Hinostroza, March 2011). It must also specify the agreements, procedures, and bodies necessary in order to ensure that the integrated project components are established, and implemented in the timelines
identified (Kfw-Entwicklungsbank, 2008). The questions aroused from the solutions generated (especially the layers of incentives) and the way forward proposals (especially the CDM relevance and the PoA) were:

- Which institutions would be capable of handling the investment required (e.g., subsidies)?
- What institution qualifies this role? What effort would this require? (EEAA, 2008d: 7)

Three alternatives were considered when identifying the eligible managing entity: (1) local/international investors; (2) the Social Fund for Development; and (3) the Ministry of Finance (MOF). The MOF was conceived as the most eligible entity that would be able to play such roles. The deputy director at the EEAA made the following comment:

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We needed a large-scale scrap dealer, and powerful arranger, coordinator, and stimulator. . . . A scrap dealer would be needed to buy the scraped vehicles and then resell them to the recycling firm that would be established. A powerful arranger, coordinator, and stimulator would be needed to stratify the program, stimulate others to participate, and coordinate among the many participants. We would need more auto dealers and more banks to join the program. There is no private entity in Egypt that could play all these roles. In addition, there is no proven success story on the international level as the idea of Program of Activities was recognized at the end of 2005, and the official templates for Design Documents suitable for Program of Activities has been approved recently. . . . in [November] 2007. . . . The main advantage of the Program of Activities is that the future, small-scale projects of the program can be included without duplicating the project registration and validation. Thus, it reduces the transaction cost involved in the CDM process. It especially designed to encourage the developing countries to participate in the CDM. . . . In fact, we gradually recognized that there was no project entity would play these roles other than the Ministry of Finance. (EEAA, Sen.)

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The EEAA prepared a memo, and presented it to the Prim-Minister suggesting the initiation of the National Program for Vehicle Scrapping and Recycling. In this context, the EEAA suggested that the Ministry of Finance (MOF) would be able to: (1) further develop the implementation mechanism (taking into consideration the solutions and recommendations of the way forward proposals shown previously; and (2) play the role of managing entity (EEAA, 2008c). Moreover, as a key actor in the pilot project, the GDT of bank A prepared a formal review document which started with the success story, the learning accumulated, and the recommendations mentioned in the way forward, and ended by a recommendation to join the acceleration phase. The review document was prepared and submitted to the Board of Directors without being reviewed and authorized by the project champion. (Please note that before the Way Forward step, radical changes had been taken place in bank A. A new chairman was appointed. Then, he hired a new TMT, and as such, new board members. The champion lost his position
(the credit executive and a board member). Finally, a major wave of job rotation and new hiring had been taken place. The newly hired heads accompanied their teams of deputies, seniors, and juniors. The loss of champion had a negative impact on not only the moral and productivity of the GDT team, but also the creativity of the team members, as shown on the step of Transition Decision and Authorization)

8.1.3 The Acceleration Phase

The acceleration phase is the third (and final) phase of the NPVR. The key actors in this phase were: the MOF; bank A; and bank Z. The chronological documentation of this phase shows that there were seven main steps. These are: (1) concept development; (2) process redesign; (3) transition decision and project authorization; (4) implementation; (5) media campaign; (6) personal training; and (7) launch and review. The following is a presentation for each step.

8.1.3.1 Concept Development

The concept had to be developed after creating it in the incubation phase to incorporate the learning accumulated, manifested in the solutions and recommendations of the way forward proposals shown previously.

The MOF

The key actor of this step was the MOF, which assigned the role of the managing entity. The memo prepared by the EEAA sent to the Prim-Minister, who passed it to the Minister of Finance (MOF), who passed it to one deputy, who formed a team to study the memo. Several inquiries had been identified by the MOF team. The team had met three teams participated in the incubation phase (EEAA, MOI, bank A) to: (1) closely examine these inquires (especially those related to the project components, the Managing Entity, and the PoAs, and CDM finance); and (2) transfer the knowledge had been accumulated during the previous phases of the project. The supervisor of the taxi replacement project noted that:

27. As soon as knowledge is articulated, you can read it. But you cannot read what is not written . . . the knowledge between the lines. So, face-to-face communication is critical to convey this background knowledge to be able to grasp the whole story. (MOF, Sen1)
The EEAA believed that the solutions generated and the way forward proposal would form a good basis for the acceleration phase. Thus, the EEAA suggested that the MOF would add another layer of incentives by exempting the imported components from customs, and to negotiate with the participating auto dealers to provide a special discount (as shown in word table 23). The MOF, however, had a more ambitious view to this phase that would accelerate the replacement program, stimulate the auto industry, and promote the banking concept. This, however, implied the massive expansion of the program. In this respect, I found that the MOF had put much emphasis on three solutions and recommendations mentioned in the way forward step when developing the concept previously created. These were: (1) enforcement; (2) financial incentive package; and (3) scrapping and recycling, and the concept of one-stop shop.

**Enforcement: The Enactment of the Traffic Law #121 (2008)**

The MOF asked the MOI to design a Traffic Law to accelerate the rate of fleet replacement (MOF, 2009a). In June 2008, the Traffic Law #121 was issued, stating that owners of mass transport vehicles (taxis, microbuses, trailer trucks, and buses) greater than or equal to 20 years old in a given year must not receive new operating licenses or license renewals. The owners of mass transport vehicles affected by this law were given a time limit of 3 years (by the year 2011) to adjust their situation, and replace their vehicles with more recent, less polluting, and saver vehicles (MOF, 2010a). It should be noted, however, that the numbers of taxi vehicles affected by the new law will be more than the one mentioned previously in the way forward proposal (word table 24). In other words, rather than replacing nearly 40,000 taxi vehicles in three years, the MOF decided to replace nearly 50,000 taxi vehicles in less than two years (as shown in table 2.14).

**Financial Incentive Package**

Designing more promising layers of incentives was seen as an integral component to support the enforcement of the Traffic Law #121, by ensuring that vehicles affected by the law are surrendered and scrapped (ESMAP, 2010; MOF, 2010a). The layers of financial incentives provided by the program participants are listed in table 2.10. Of particular impotence is the incentive provided by an **Ad agency**. The MOF added another new, valuable characteristic to the program. It made an agreement with an advertising company to place ads on the new purchased taxis, and, in return, the agency should pay EGP 650 fixed monthly payments: EGP 550 paid directly to commercial
banks contributing to the repayment of the monthly loans on behalf of the taxi owner; and EGP 100 paid to the taxi owner. This characteristic, however, was optional to the driver (MOF, 2009a, 2010a).

**Scraping and Recycling and the Concept of One-stop Shop**

The PoAs was set to be implemented in two separate sites: Temporary Scraping and Intermediate Storage Site; and Permanent Scraping, Intermediate Storage, and Recycling Site (MOF, 2010a). As shown in figure 2.3, the first site reflects the suggested concept of one-stop shop mentioned in the solutions generated in the way forward step. This concept allows the taxi owner to have the old vehicle inspected and scrapped, purchase a new vehicle, get insurance and licenses, auto loans, etc., *all in one place*. This concept, thus, has made the process more smooth, and helped achieve a high program participation rate (ESMAP, 2010). (Please note that the program institutional organization was presented in figure 1.2, and the key roles and responsibilities of the participants involved were presented in table 2.12.)

**8.1.3.2 Process Redesign and Integration**

Developing the replacement concept implied designing new internal processes (with regard to the roles and responsibilities of the new actors: the MOF and ad firm), in addition to redesigning the whole workflow. Please note that the final version of the process map of replacement was presented in figure 2.4, and the process tasks were further explained in table 2.13.

**8.1.3.3 Transition Decision and Project Authorization**

**The MOF (The Establishment of the MOF-Fund)**

The MOF established a new Fund having its own budget and its own balance to: (1) fulfill the MOF’s roles and responsibilities related to the financial incentives as identified in table 2.12 (e.g., taking the procedures required to exempt customs on imported components of the vehicle and to pay vehicle sales tax on behalf of the owner); (2) develop the financial resources of the Fund (e.g., the funding allocated from the public budget; and the grants and donations accepted by the board of the fund); and (3) develop a comprehensive plan specifying the implementation priorities according to the available funding. The board of the Fund has full control over its own affairs and is
responsible for its own decisions. The board of directors included 14 members: the CEO and another four executives from the MOF; one executive from the MOI; one executive from the MOE; one executive from the Ministry of Administrative Development; three executives representing the three GCR governorates participating in the PoAs; and three executives representing the three participating banks (CDM.UNFCCC, 2009: 55-56).

**Bank A**

Before the loss of champion, there was an *implicit agreement* among the GDT members and the champion that the product should remain under the umbrella of the SMEs Division. But, a clear plan regarding how this would be implemented was not crystallized. (Please recall that the GDT, which had been participating in the NPVR, was mainly responsible for developing products for the SMEs division. However, if a template was developed for this SMEs product, this standardized product would be transited to be managed through the advanced IT system of the Retail Banking Division, as shown in word table 7/9.) After the loss of champion, the team had a very *ambitious*, though *unrealistic*, plan for the acceleration phase.

> [It was unrealistic because] the process developed to be decentralized as it was in the pilot project, but should be introduced through the 150 branches in the Greater Cairo Region to benefit from the wide network of branches nearly covering all the main zones in this region. . . . [It was ambitious because] there would be a target. . . . To stress the target, these branches would be required to produce a monthly report sent directly to the SMEs Division about the product performance, like the number of cases approved, the number of cases under consideration, and the non-performing cases. (A, Mid1)

Based on the launch plan mentioned in the previous word table, the GDT redesigned the process to implement the newly developed concept, and prepared a product template. The SWOT analysis was revisited to take into consideration the new players involved in the business model (e.g., the MOF and ad agency) in addition to the competition (two competitors, banks C and Z, joined the protocol). A memo was prepared and submitted to the new VC to be authorized. The participation in the acceleration phase was accepted, but the VC decided *to make the best use of organizational resources*, especially the IT system. It was decided to transit the product to the Retail Banking Division (RBD). The transition decision, however, was resisted by the GDT. One team member stated that:
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It was not just a [transition] decision. It was like a quarrel. The product was designed to be managed through the SMEs Division as it should be: the taxi is a business, we finance a business, and the revenues generated from this business would be used to repay the loan. So, it is an SMEs concept, not a retail banking concept, like car loans. It is not a consumer concept. . . . Also, if we could capture nearly the quarter of the market share, then it would be more than EGP 0.5 billion in the SMEs' portfolio. . . . Also, we were the team that participated in the pilot project, in addition to the concept development and process redesign in the mass production [acceleration] phase. We did everything related to this product, and the people in the Retail Banking Division did not do anything. . . . The transition decision was like somebody stunning us in our face. We were shocked. . . . But we did not surrender. . . . We did appeal the ruling. We had tried to negotiate directly with the vice-chairman. (A, TM)

The new VC insisted that the product should be transited to the RBD. He made the following argument:

- The product is standardized like retail banking products . . . there is no credit study required as the loan application is designed as a template, and the taxi owner is committed by fixed repayments. Therefore, whatever the revenues of the taxi business, the taxi owner is obligated to pay fixed installments, exactly the same as car loans. As such, the product could be seen as retail banking concept. And, it is managed as a retail banking product abroad [in developed countries]. (A, TM)

- You designed the product to be managed in a decentralized way. This is completely inefficient. Do not forget that there are many related players in the workflow, and you are responsible just for a part of the process. You are a node in a larger network. So, you have to accelerate yourself.

- Managing the product through the IT system of the Retail Banking Division could allow the use of the CardPac. Thus, the taxi driver would be allowed to make the repayments through a card. This would make the process more efficient, more reliable, and more flexible. . . . Also, how you would follow the product performance, taking into consideration that the IT system of the SMEs does not have advanced reporting tools. Within the IT system of the SMEs Unit, it will not be feasible to achieve these benefits. But, with the retail system, it is feasible. (A, TM)

Although the transition decision seems rational in this case, one team member stated that:

We had tried. We had met him [the VC] several times and presented several alternatives. We conceived the concept as a business. . . . Also, we conceived it as our baby, and we had to care about. We had been saying that we were the project owner. . . . As they are the decision makers, we failed to keep our baby, and the baby had to be moved to other people to be adopted. It was inheritance. (A, TM)

Another characteristic was added to the product by moving it to the IT system of the RBD. It is the flexibility of the repayments. That is the card holder (taxi owner) is allowed to repay the balance on several times during the grace period (the first 15 days
of each month). The GDT team, then, modified the memo taking into consideration the transition decision, and re-submitted it to be authorized. The memo was accepted, and the project should leave the SMEs Division to the RBD.

8.1.3.4 Implementation

Bank A

The new VC made a decision to the RBD’s executive to receive the product from the GDT of the SMEs Division. The formal decision involved managing the product through the Central Department of Auto Finance, and by using the CardPac System. An informal decision was also made by the VC to assign two members of the GDT and the head of the Home Gas Connection Department to join the transition team. A cross-division, cross-functional transition team, then, was formed: two members from the GDT; and three new members from the RBD (the auto finance manager, the retail credit manager, and the gas connection manager). The last manager was joined the team to facilitate the transition to the RBD. (Please recall word table 7/9. This member participated in several transitions.) Although the whole story, including the financial product characteristics and the roles and responsibilities of related players, was articulated in the product file, a series of meeting had to be made to absorb the concept from the business wise. One member of the GDT stated that:

> Although the new team had formally received the product file, you would not give this team the product and run away. As we were the building team, our participation in the new team was necessary to tell the whole story, from the first step in the pilot project until project authorization in the mass production phase. . . . And, do not forget that we were the team that memorized the articulated story, and most importantly the unarticulated one. . . . This was important as the receiving division would be responsible for the product from a to z. (A, TM1)

After discussing the product form the business wise, a team was formed to develop the operational details of the front-office operations (the customer service individuals at some branches which would be responsible for handling the whole case except the back-office operations) and back-office operations (credit risk activities: e.g., I-score, and authorization) which is managed by a centralized division, the Credit Risk Division. The team also developed the operational details fulfilling the roles and responsibilities of the on-site representative branch (at the one-stop shop). These roles were: providing information for activity implementers; collecting the documents coming from the related players in the site and sending it to the branches; and also receiving the
documents coming from the bank and sending it to the related players in the site. A new unit was established in the head office (the Taxi Unit), but only for archival purposes, keeping the client files. The team also asked the Call Center to assign a Hot Line just to provide information about the financial product.

After developing the operational details of the new product, members from the Card Center joined the team to discuss the product and develop the operational details of the CardPac (the specifications of the card: e.g., deposit only card, the grace period). Following this was developing the product from the IT wise. The operational details of the CardPac were submitted to the IT specialists to: develop the product code; link the card to the customer account; make a simulation scenario to test the product features on the system and fix any bugs. Also, the product template was sent to the audit and legal departments for revision and preparing the Power of Attorney. Moreover, the auto finance manager with the cooperation of the branch control manager decided to start with a few number of branches for the purpose of soft launch. Only six main branches were assigned to handle the front-office operations with the taxi owner. In this context, the auto finance manager made the following comment:

33 The product was new to us, and the new process was complex. The segment also was new to us. . . So, we did not have the confidence to move aggressively. We decided to select a limited number of branches for the purpose of the soft launch. . . We selected six branches . . . three branches at the north of the Greater Cairo Region and another three at the south. . . We believed that this would provide a somewhat relevant coverage to this wide region. Our intention was to work on a wider scale after accumulating some confidence. (A, Mid3)

Finally, the team made the product projections (e.g., the process time cycle; the projected sales of each branch; the total projected sales; and the total projected cost).

**Bank Z**

The MOF-Fund protocol was passed directly to the RBD. The protocol was translated into operational procedures in a manner somewhat similar to bank A. However, two main differences in the implementation step should be mentioned. First, no ATM card was issued to the taxi owner. Second and most importantly, although the bank did lack the experience gained by bank A during the incubation phase, the Auto Loan Unit assigned ten main branches for the purpose of hard launch. The ten branches were chosen based on two main criteria as shown below.
It was important to select branches that would provide an appropriate coverage to the wide area of the Greater Cairo Region . . . at the north, at the south, at the east, at the west, and at the center. . . . Soft launch? . . . Soft launch was not relevant. Our competitors were launching their products at the same time. So, it had to be hard launch.

It was critical to select branches in popular neighborhoods instead of the advanced ones. . . . The new segment was seen as under bankable in terms of finance. So, the client would be more comfortable psychologically with the former type of branches than the latter. In fact, he or she might fear to get in the later. . . . Also, our current customers were in our mind as the new ones had different demographic characteristics. (Z, Senn)

8.1.3.5 Media Campaign

The MOF-Fund

The MOF-Fund, in cooperation with an advertising agency, designed the media campaign of the NPVR that would be placed in local and national media. Press releases, conferences, and special events were assumed an integral part in this campaign. The content of the message emphasized, among other things: (1) the benefits delivered to the taxi owners (e.g., the financial incentive package specific to the project participants); (2) the benefits delivered to the public (e.g., the environmental impact of the project; improving the quality of taxi service, and improving the traffic flow and safety; improving the civilizational image and promoting tourism; and supporting sustainability); and (3) the key roles and responsibilities of the actors participated in the program.

Bank A

A team from the public relations department and an advertising agency joined the transition team to design the media campaign, including the message format that would be transmitted by both the production channels (the customer services at the 6 branches, and the on-site representative branch) and marketing channels (advertising, Call Center, and public relations). The media campaign was designed to persuade the clients (see for example photo 8.5), and inform them about the product features and capabilities. For example, to make the advertising message noticeable, the following short-format message was chosen to highlight the product advantages: (1) speed; (2) easier procedures; (3) the largest network of branches and ATMs for loan repayments; and (4) the possibility to pay the monthly repayment on more than one part during the two-week grace period (flexibility). In this context, two main types of advertising media were chosen: print (newspapers, and brochures); and out-door media (billboards and ads
on exteriors of the new taxis). Other channels of advertisements, like the bank Website, and ATM screens were not used in this product.

**Bank Z**

There is evidence that competitors may bear more advertising cost to neutralize the known benefits produced by the superior innovator. Bank Z had designed more proactive marketing campaign than the other competitors, including the radical innovator bank A, to attract more from the customer segment. In addition to the two traditional media channels used by all participant banks (print and out-door), one main press-release conference had been arranged to announce the product launch. In addition, bank Z had added a fourth channel, *the personal selling*. This may be considered more creative as there is no specific place for the community of the taxi owners other than the main (cheap) coffeehouses and cafeterias at which a large number of taxi owners gather. (Please recall that, as mentioned in table 2.7, there is no formal association for taxi owners, and about 99% of taxi vehicles are owned by individuals (thus, only less than 1% is owned by taxi companies.) Also, several main taxi parking places were targeted. The personal selling had been considered more effective than the traditional channels. One manager noted that:

> I believe that the traditional ways are not as effective as many marketers think. I believe that the word-of-mouth is more effective, as customers trust each other experiences. . . . We had identified a target for each branch of the ten branches, and assigned several direct sales teams to achieve this target, and we followed this target. . . . The sales people visited the main coffeehouses and cafeterias where the taxi owners were used to spend some time. . . . And, the flyers were designed to have significant, attractive, and easy-go educational content. By doing so, we got directly to the targeted segment. . . . And, the sales people were professional. . . . They knew how to stimulate the word-of-mouth and the referral behavior. And, these efforts had been reflected instantly in the product sales. . . . Yes, instantly. The market was waiting. . . . Because of the enforcement [the new Traffic Law]. (Z, Sen₂)

### 8.1.3.6 Personnel Training

**Bank A**

After developing the operational details and designing the media campaign, the product features and capabilities were scripted, the periodicals were prepared, and an *all-members email* was sent to all the employees. However, *no formal training sessions had been conducted*. The main reason mentioned was:
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

Our employees are well trained to handle any new product. Therefore, there was no need for formal training for this product, and the all-members email attached by the product periodical was OK. . . . Formal training is important only if there will be a new feature on the IT system that will handle the product. Otherwise, a hot phone number to answer the employees inquiries is enough. . . . In this case, we receive a high number of hits in the first two or three months. After this, everything will be OK. . . . Another important form of informal training is the in-between employees training. . . . An employee in one branch phones a colleague in another branch, mostly in the same zone, to get information regarding how to manage the case or solve a problem. . . . Yes, that is it. (A, Mid3)

Bank Z

Again, Bank Z followed a more interactive, formal form of training. After preparing the product periodical, a one-week, in-house, formal training session had been conducted to all personnel involved in introducing the new product, including the front- and back-office personnel.

We had undertaken training sessions for the business people . . . sales, branches, call center, and also for the credit people participating in this product . . . . With new products, you have to train your employees, and not to leave anything to chance. (Z, Mid1)

8.1.3.7 Launch and Review

The MOF-Fund

In the 12th March 2009, the “First Phase” was launched, and the taxi owners in the waiting list prepared in the pilot project were the first to participate. It was planned to replace “34,370” old taxis in this phase (Minister of Finance, 2009, March 05, 2009, March 12). Thus, it is understood (based on table 2.14) that the first phase would involve 8 CAPs, and would be ended by the end of June 2010. Though, Phase I was stopped on the 28th February 2010 (Saad, 2010, April 24). It is important, however, to show the progress of the program before discussing the real reason for halting the program. Table 8.4 presents the program progress until the end of February 2010.

Table 8.4: The Progress of Phase I until the End of February, 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>No. of Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replaced vehicles</td>
<td>20,500</td>
</tr>
<tr>
<td>Passed step 2 (designation of new vehicles)</td>
<td>3,200</td>
</tr>
<tr>
<td>Total</td>
<td>23,700</td>
</tr>
</tbody>
</table>

Source: Compiled from Abdul-Razk (2010, February 27); and Saad (2010, April 24, 2010, October 2).
The previous table shows that there were 20,500 vehicles replaced, and 3,200 vehicles designated the engine and chassis number. All the 23,700 vehicle owners had been negatively affected by two issues: the ad crisis; and the limited capacity of the storage site.

**The Ad Agency Crisis**

The ad agency was committed to share a 31%-58% portion of the loan repayments (EGP 550 monthly) in addition to paying EGP 100 monthly for each taxi owner in return for the placement of ads on the new taxi. However, the agency could not honor this commitment nearly after 6 months from the launch date, and it discontinued its payments into the bank accounts of the taxi owners. Thus, the accounts of the 20,500 taxi owners had shown a non-performance status although they were committed to regularly pay their shares. As a result, the participant banks had rejected to produce a letter allowing these taxi owners to renew the license. To solve the problem, the MOF-Fund announced that it committed to absorb the payments due by the ad agency until another agency could be found. Three major reasons were cited to explain the ad crisis as follows:

1. The difficult national economic conditions (e.g., the soaring inflation rate);
2. The 2008 financial crisis which had a negative impact on all economic activities; (MOF, Sen,)
3. The ad market cannot absorb such a high number of taxi vehicles. . . . In fact, the ad agency placed ads on only 40 percent of the taxis joined Phase I [8,200 taxi vehicles out of the 20,500 taxi vehicles]. [The Minister of Finance (2010, May 1)]*
   - When the supply of any product or service increases, the price gets down. A substantial increase in the supply may imply no demand. This is the case of the ad component. The Egyptian ad market has a specific budget. Thus, the ad agency had experienced problems in marketing the ads of the 20,500 taxis. [The Minister of Finance Advisor (2010, April 24)]**
   - The expansion of the national program, in addition to the high participation rate in the ad program made the placed ads losing any advantage, and, as such, the ad agency had not been able to attract new advertisers. (A, Mid)

---

* This speech was made to the most famous television talk show in Egypt (Masr ElNahrda: http://www.masrelnahrda.net) produced by the Egyptian Radio & Television Union. After the Egyptian Revolution, the webpage of the talk show was suspended. Thus, the talk show’s channel on YouTube (http://www.youtube.com/user/MasrElNahrdaEG) was followed. The episode host was Mr. Saad (2010, May 1), and the guest is the Minister of Finance.

** The same as previous. The episode host was Mr. Saad (Saad, 2010, April 24), and the guest is the Minister of Finance Advisor.

---
On the 28th of February 2010, the Fund announced the halt of Phase I, and, as such, the scrap-yard did not accept new vehicles, including the 3,200 ones. Few weeks later, the fund announced the end of Phase I, and the design of new protocol for Phase II (Saad, 2010, April 24). Phase II was launched on the 15th April 2010. (Please note that no end date has been declared by the managing entity. The current research, however, covered this phase until December 2010, before the Egyptian Revolution, as it was difficult to follow the program after this major event.) The target was to cover the 29,837 (the 50,337 mentioned in table 2.14 minus 20,500) taxi vehicles. Several modifications have been made to the scheme of this phase. Examples are: removing the ad program; adding 6- and 7-year loan tenures; and adding another eight vehicle models to the list of eligible vehicles (MOF-Fund, 2010; MOF, 2010b). Despite the removal of the ad component from the protocol of Phase II, nearly 11,300 taxi vehicles had been replaced. Thus, the total taxi vehicles replaced under the national program were nearly 35,000 vehicles (till January 1, 2011). This represents 69.5 percent of the target shown in table 2.14.

**The Limit Capacity of the Temporary Scrapping and Intermediate Storage Site**

In December 2009, the MOF announced in newspapers a tender concession bid for the sales of scrapped taxi vehicles, and the establishment, operation, and maintenance of vehicle recycling plant (MOF, 2009b). Four competing firms submitted their tenders. Unfortunately, none of these tenders met the environmental, operational, and financial requirements identified by the EEAA and MOF-Fund and mentioned in the request for proposal (RFP). One major reason mentioned was that the RFP required the prospective recycling firm to initially withdraw 15,305 taxi vehicles from the scrapped stock, and 2,000 (estimated) ones each month. (The 15,305 vehicles represented the actual scrapped vehicles before preparing the tender concession bid.) This, however, was considered as incapacitated requirement. In April 2010, the MOF simplified the operational and financial requirements and re-announced the tender concession bid in which one local firm won the public bid. In July 2010, the winning firm started to gradually withdraw from the stock of scrapped vehicles. Such a delay in the recycling process, however, led to “the accumulation of vehicles in the temporary scrapping and storage site”, which led to a delay in the scrapping process. As the site had been fully accumulated, many “despaired taxi owners had left their old vehicles outside the site, on the road sides”. In other words, the limited capacity of the scrapping site and recycling
firms had caused the program to setback at some times, and to slow down at other times (Dyaa, 2010, April 30, 2010, July 26).

**Banks (A & Z)**

Regarding banks A and Z, this step emphasizes comparing the product projections with the actual figures, and identifying the reasons of deviation, whether normal (regular) or abnormal (irregular). It also seeks to collect the feedback regarding any problems or suggestions from: the staff participated in the process (especially the front-line staff); the clients; and the other related players in the process. Any modification regarding the process and/or final characteristics should be authorized, incorporated, and circulated. Or, the deviation may highlight the need to update the projections themselves. (It should be mentioned that the two members of the GDT team were completely withdrawn after few cases were fully processed.) It might be useful to categories changes had been taken place in both banks into: changes in the process; and changes in the capacity.

**Bank A**

The RBD of bank A usually undertakes product review each 6 months, including the first review. No major changes had been undertaken for the process. Minor modification had been made to the process to cope with the ad crisis. The auto finance team removed the add component (EGP 550) from the loan application. Minor modification also made to the capacity. During the soft launch, other two branches were added to the six branches to cope with the high demand at the start. *There were no other changes made in response to changes in the competitive situations.*

**Bank Z**

Regarding the process, the first formal product review is usually undertaken after 6 months. Though, during the hard launch, the development team had undertaken a continuous monitoring (daily watch). Issues that had a pattern were reported and investigated, and a correction was made. This daily watch had continued for nearly 3 months until the process was generally described as well-based. During the three-month hard launch, major changes had been undertaken to the process. The head of the taxi unit established made the following comment:

> Well, it was a mess at the beginning. The development process was crashed in time and was not a smooth task. Even simple decisions taken during the development process were changed later, after the launch. . . . For example, the taxi owner was required to sign a blank check before the ...
Despite struggling at the beginning, the customer service staff was able to handle the customer complaints. The head of the taxi unit made the following comment:

> Our customer service people know well how to handle customer complaints. So, despite the operational inefficiency decreasing the service speed at the start, the customer service people reduced the expectation with regard to speed, and also were able to handle the customer dissatisfaction. This had got the taxi owner satisfied at the end. (Z, Mid₁)

Regarding the capacity, managing the capacity during the hard launch represented the way by which the market had been geographically extended, and, as such, the opportunity had been consolidated. It had a critical impact on the expansion plan. The following quotation was noted:

> Because of the aggressive marketing campaign we implemented, and also because of the massive expansion of the program sought by the Ministry of Finance, the level of demand had exceeded the optimum capacity of the 10 branches, and taxi owners perceived a deterioration in service quality to the extent that some taxi owners were denied the service. This coincided with a complaint from many taxi owners that the number of branches did not provide well-coverage to the Greater Cairo Region. These feedbacks had been studied, and another 8 branches were added to avoid losing business.

> The way by which the capacity had been increased? . . . Well, we usually follow this expansion strategy. The personnel in the first 10 branches had been trained as I told you previously. When the level of demand exceeded the optimum capacity of one main branch, new cases were referred to a new branch in the same zone of the main branch. This main branch was assumed a major role in the expansion, including the training of the personnel in the new branch. . . . Yes, the main branch was considered as the product owner. . . . Yes, the main branch manager was considered as the retail manager in this zone, and was compensated as such. . . . In general, if the main branch does not achieve the target, a formal investigation is opened. . . . We might initially set unrealistic expectations, or there might be some obstacles. . . . Or, the main branch might not catch the opportunity. (Z, Mid₁)

After the hard launch, the product was launched with the target ceiling identified. After this, the regular, semi-annual product review have been undertaken to follow the
product and market performance, unless there were any surprises (e.g., competitive attacks, or unusual default rate).

8.2 Taxi Owner/Driver Experience

During the two academic missions, I decided to interview some activity implementers (taxi owners/drivers) to ask about the quality of the program enabling me to understand the initiative from another point of view. The data will be re-categorized under four titles: (1) satisfied with the replacement idea; (2) unsatisfied with the vehicle; (3) unsatisfied with the role played by the Ministry of Finance (the Managing Entity); and (4) unsatisfied with the quality at service encounters.

**Satisfied with the replacement idea:**

<table>
<thead>
<tr>
<th>Quotes</th>
<th>Similar Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>When my old taxi was broken down during the journey, I had to ask some passers-by to help me pushing it to the roadside. Then, I would open the bonnet, and lean over the engine compartment to see what was going on . . . trying to repair the fault. If I could not, I would call a colleague or friend to come with a heavy strap to pull me to the nearest repair workshop. . . . It was a real pain. (CUS$_8$)</td>
<td>31</td>
</tr>
<tr>
<td>I feel confident with the new car. . . . With the old car, many passengers were afraid to wave to me to pick them up. (CUS$_{15}$)</td>
<td>47</td>
</tr>
<tr>
<td>The new vehicle has opened a new business opportunity. . . . The buses of international schools are very expensive. . . . They cost EGP 3,000 a year for each student. This is the minimum. I made a deal with ten families to carry their children to and from school . . . Each family pays the third. (CUS$_9$)</td>
<td>14**</td>
</tr>
</tbody>
</table>

* Please note that the main reason for citing similar responses is that “counting” is a “good way for testing for possible bias, and seeing how robust our insights are” (Miles and Huberman, 1994: 254).

** Other new business opportunities included being hired by: “a university professor for three days a week” (1 response); and “small hotel on a full-time basis” (3 responses).

**Unsatisfied with the physical evidence (the taxi vehicle):**

<table>
<thead>
<tr>
<th>Quotes</th>
<th>Similar Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>-They took my well-maintained, Peugeot 504, 7-seat taxi [manufactured 1979] and give me this [his new 4-seat taxi].</td>
<td>1</td>
</tr>
<tr>
<td>-Arab tourists had always liked the previous spacious one. And, the travelling to Sharm El-sheikh and Ghardaga was like almonds [a piece of cake]. (CUS$_{80}$)</td>
<td></td>
</tr>
<tr>
<td>-Old cars were made to last longer. . . . They were made from all steel and harder metal parts. These ones were relevant to our streets. All the low-entry eligible new cars are designed to go to service stations each month. . . . These cars are not strong. They are not designed for taxis. And they are not relevant for our streets. The old taxi was a real vehicle. . . .</td>
<td>31</td>
</tr>
<tr>
<td>-No, it did not consume much gas. You remind me. I installed the gas tank in</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Quotes</th>
<th>Similar Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>the old vehicle for about EGP 5,000. And, they scarped the old vehicle. (CUS35)</td>
<td>1</td>
</tr>
<tr>
<td>There is a technical defect in the gas fuel cycle in the vehicle engine. . . . How can I explain this to you? . . . We can say that the compressed natural gas device currently installed is inadequate with vehicles with electronic injection. (CUS4)</td>
<td>2</td>
</tr>
<tr>
<td>* “In terms of endurance, many of the vehicle models chosen were not relevant to the taxi operations”. (C, Mid1)</td>
<td></td>
</tr>
</tbody>
</table>

Unsatisfied with the role of the Managing Entity (the MOF):

<table>
<thead>
<tr>
<th>Quotes</th>
<th>Similar Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait . . . see . . . these are the newspapers clips [regarding the Minister of Finance speeches] I have collected so far. . . . I and other 37 colleagues delegated a lawyer to fill a case against . . . [the Minister of Finance]. . . . Because we are belonging to the 3,000 taxi drivers [the 3,200 taxi owners] who joined the first phase. . . . All of us had been assigned new vehicles before 1 January 2010. We had been trying to scrap our vehicles for two months. Each time the people at the [scrap] yard told us to come the next week because there was no space in the yard. We had been like this for four months. . . . [The Minister of Finance] announced in May that we could join the ad program. At first, banks agreed to accept paying only our share. After few weeks, they told us that the . . . [Minister of Finance] sent instructions that we must pay the whole installment. We had been trying to meet the program supervisor for weeks. . . . No one had met us. We demonstrated in front of the Ministry of Finance. The Deputy of . . . [the Minister of Finance] met us, and promised to solve the problem. He did not. The banks classified us as defaulters, and sent a list of our names to the Central Bank. We demonstrated many times. The last time the banks told us that they would purchase the right to place their ads on our vehicles. Then, they changed their minds. . . . Each time, we start solving the problem from scratch. (CUS12)</td>
<td>29</td>
</tr>
<tr>
<td>- The way by which the Ministry of Finance manages the project is disappointing. - If managing a national project like this is a failure, what about the state budget. (CUS25)</td>
<td></td>
</tr>
<tr>
<td>- I do not know why the Ministry of Finance gets us pay for these vehicles. . . . These vehicles are grants. . . . - The money is a grant from the United Nations. (CUS17)</td>
<td>12</td>
</tr>
</tbody>
</table>

Unsatisfied with the quality at service encounters:

<table>
<thead>
<tr>
<th>Quotes</th>
<th>Similar Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queues, queues, queues. . . .</td>
<td></td>
</tr>
<tr>
<td>- Queues at the service stations . . . when making the periodical maintenance. I have to get early . . . at 05:00[am] to be able to finish before 03:00[pm]. . . . Why? . . . Because the number of the service stations assigned by the . . . [auto dealer] is not sufficient. - Queues at the traffic department when renewing the license each three months.</td>
<td>29 27</td>
</tr>
</tbody>
</table>
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8.3 Post-Analysis Findings

A first-level analysis has been conducted to present a process model for radical service innovation. This model has included three phases which have covered 23 steps. By analyzing this process model, I will be able to present another set of findings that will serve the conceptualization process and/or the development of research proposition. The following is a presentation for these post-analysis findings.

8.3.1 Pilot Project vs. Concept Testing

Pilot projects of this kind have three advantages: (1) reducing the technical and market uncertainties through testing assumptions and accumulating new learning; (2) testing the capabilities and commitment of new partners; and (3) enabling the partners to gradually build the relevant capabilities. The GDT made the following comments:

This program was the first of its kind in Egypt. So, the implementation mechanism [replacement process] was completely new. It also was targeting an under bankable segment. So, with the lowest possible cost, you need to develop an implementation mechanism, and test it in the real life to be able to explore its issues and develop more promising one. . . . We knew that the process was inefficient. But, it was not our intention to improve something without knowing it first. With the learning accumulated you can improve many things, if you decide to continue. . . . Another important advantage for pilot projects of this kind is that it could enable you to plant trust with regard to any new relationship . . . like, bank-MOI; bank-taxi owner; and taxi owner-passerenger. . . . A third advantage is that pilot projects enable any partner to gradually build the capabilities required to play new roles and responsibilities. The last two advantages were learnt from some previous national projects that were failures. (A, Mid1)

When you develop a theory you need to test it to make sure it is correct. The same applies to radically new products. We cannot enter new segment with a new product just based on our assumptions. We may lose the money. So, we need to test our assumptions through a small scale project with a small amount of authorized money. This pilot project is not only intended to validate the product features, criteria, risk factor control, but also new product features may be
generated and new risk factors may be identified. Also, we need to test our assumption regarding the market sound and the growth rate of the market. If the project is successful, we may still need to enter the market gradually to be able to integrate more leaning and confidence. (A, TM)

With such a new, complex process, you cannot learn about the market without with-the-product learning. . . . I mean you have to create the reality first, and let your client experience it to be able yourself to identify the issues and leaks. If you made a concept test with the client, you would most likely hear some of the following: OK, make it first and let me taste; or Thank you, the car is working. . . . The former needs the reality to give you a real response, especially that most of your clients cannot share your dream. The latter fears the change, especially unknowledgeable clients. So, create the reality for the former and enforce it on the latter. (A, TM)

8.3.2 The Weaknesses and Threats of the Acceleration Phase

There are two main weaknesses inherent in the acceleration phase. These are: massive expansion; and lack of transparency. Taken together, these create the lack of trust (a threat).

8.3.2.1 Massive Expansion

I have provided evidence that the philosophy underpinning the acceleration phase of the NPVR was to massively expand the program. However, the EEAA and Kfw, which are mainly interested in environmental protection and sustainability issues, warned against expanding the program without taking into consideration the operational and economic impact on the related players. This, however, suggests that the managing entity (MOF-Fund) did not take into consideration the valuable recommendations generated from the incubation phase, especially that the program should be stratified, and must take into consideration the capacities of the related players especially which would pose bottlenecks (e.g. the auto dealers). In this respect, it might be noticed that at the core of this national program was the following players: (1) the participant auto dealers; (2) the ad agency, which was assumed to pay a significant share (31%-58 percent) of the installment; (3) the scrapping actor (MOI); and (4) a vehicle recycling firm. In fact, all these actors have lacked the capability for the program to be expended massively. For example, the auto dealers have had to increase production to three shifts a day to increase production by 50 to 60 percent more (MOF, 2009a). In this respect, the high demand on specific vehicle models had a negative impact on the ability of the auto dealers introducing these models to satisfy their responsibilities with regard to the delivery speed (None, 2010, April 27; Raafat, 2010, June 7); the spare parts’ prices;
and the *priority of access to service stations* (as shown in word table 46). Moreover, placing ads on vehicles and scrapping and recycling old vehicles are new businesses to Egypt.

However, neglecting these valuable recommendations has created *many struggles to all participants, including the managing entity itself*. The ad crisis and the limited scrapping and recycling capacities discussed previously are cases in point. In this respect, I was keen to know why the program was expanded in this way although a program that was the first of its kind in the country should not be expanded massively. Thus, I discussed this issue with the CEO of a company for automotive trading that did not participate in the NPVR. He made the following comment:

> The financial crisis had a negative impact on the auto dealers in Egypt. Also, the popular campaign of let it rust, let its model older had shown some success. . . . It is a campaign calling Egyptians to boycott all car dealers until they reduce their prices. Thus, the program lost its track. . . . In this program? . . . No, our cars are not designed to work as taxis. If we participate in the replacement program, our reputation would be negatively affected. . . . Even our sales from the white color have dropped. . . . The white color was a favorite one for many people, especially wealthy people. However, after few months of the program launch, many of these people have been reluctant to buy this color. (Auto Trade, CEO)

In other words, the most powerful key actor in the acceleration phase (the managing entity) made the program losing its track through neglecting some valuable recommendations that were the results of the learning accumulated from the incubation phase.

### 8.3.2.2 Lack of Transparency

Transparency may be identified as another issue confronting the program. The MOF-Fund had not designed a well formulated public message, stressing, among other things, how the program was financed, and what were the real reasons of the setbacks discussed previously. Many gossips have spread like the wildfire. Of particular importance is that many of the taxi owners have believed that the program is financed through an international grant (from the UN), and they should replace their old vehicles for free, without paying any money (word table 45). In this context, the GDT manager made the following comment:

> It was not our responsibility as a bank to convey the right image about the project, or even correct the bad image dispersed widely among the taxi community. It was the responsibility of
Finally, the Minister of Finance appointed after the Egyptian Revolution made the following statement:

> The taxi replacement project sponsored by the Ministry of Finance has not received any grants from any national or international organization, pointing out that all the benefits granted for the taxi owners participating in the project are funded through the Ministry of Finance Fund [MOF-Fund]. (Hesham, 2011, March 11)

### 8.3.2.3 Lack of Trust

What threatens the national program is the lack of customer (taxi owner) trust due to the two previously discussed weaknesses. For example, the MOI designed the Law#121 in a way that would put the owners of the aging fleet of mass transport (taxis, microbuses, trailer trucks, and buses) in an illegal position, giving those vehicle owners only three years to adjust their situation. This has created panic. Furthermore, the way by which the ad crisis was managed by the MOF and the speed at which the decision had been taken contributed to such a lack of trust. Moreover, the auto dealers did not recognize their limited capacities in terms of vehicles production and after sales service. Finally, the participant commercial banks were also responsible for exacerbating the ad crisis. At first, they asked the 23,700 taxi owners to pay the ad installment instead of the ad agency although there was no clause in the old loan application mentioning for such commitment. Also, as the MOF had spent long time (more than three months) trying to find a substitute for the old ad agency that could pay the same ad installment, the three banks classified these customers, who actually committed to pay their share, as defaulters and sent a list of the 23,700 to the Central Bank of Egypt (Dyaa, 2010, June 7, 2010, June 11). All these actions have participated in such lack of trust. In fact, the proposal prepared by the Kfw-Entwicklungsbank (2008) warned against this when stating that:

> If too many onerous conditions are placed on taxi owners, there is a risk of alienation leading to a lack of cooperation. (Kfw-Entwicklungsbank, 2008: 29)
8.3.3 The Evolutionary Nature of Radical Innovation

A key post-analysis finding is that radical innovation has an evolutionary nature. The evolutionary path is obvious in the three phases: direction; incubation; and acceleration. In the direction phase, the idea was not recognized at the start of this phase. The raw idea (solution) of vehicle replacement was grown out of the obstacles realized when implementing two pilot projects that had no relation to the replacement idea itself. Further studies were required to understand the baseline context, justify the opportunity, and recommend the incubation effort. Also, the idea owner (EEAA) had continued to build its institutional capabilities (e.g., data base, technical knowhow), with the cooperation of national and international partners. In the incubation phase, a concept was created, and an initial business model (or value chain) was suggested to implement this concept. Moreover, this concept and business model was tested in reality to reduce uncertainties (testing assumptions and accumulating learning), identify the issues of this concept and business model, and generate solutions and recommendation that would base the next phase. In the acceleration phase, the concept had been further developed to incorporate the solutions and recommendations of the previous phase, and the business model had been modified as such. Also, incremental innovations have been introduced though the amendment of the protocol (adding new characteristics or players, and removing old characteristics or players). A member of the GDT stated that:

> At the beginning of the Pilot Project, we did not know who would participate in the project. The business model created was purely tailored, and the shape of the value chain followed an evolutionary path. . . . Who could imagine that the Ministry of Finance and ad agency would play key roles in later steps of the project? . . . So, the business model build was purely tailored. (A, TM_2)

According to the characteristics-based approach of innovation (Gallouj, 2002: 136), two main points are at the heart of the evolutionary theory. First, the product (especially final and technical) characteristics experience a gradual improvement driven by cumulative learning (gradualism). Thus, the innovation starts by just a basic solution, and ends by a dominant design (a stable set of service characteristics). In this respect, the process model presented throughout this chapter provides empirical evidence for this cumulative learning and its impact of the product characteristics. Second, there is a wealth of interactions among several actors during this path. In this respect, I have provided evidence about the existence of multiplicity of interactions among many private and public actors during the project life-cycle. In other words, I have provided
evidence that the NPVR followed the institutional innovation pattern, in which several institutions collaborate to produce the radical innovation. Table 8.5 presents the evolutionary nature of the NPVR in terms of the characteristics-based approach: the market needs (Ns); the components of the core-supplementary combination solution (Y), or the service concept; the operations and technologies (Ts) used to produce the solution components; and the related employees and customer (activity implementer) competences [(Cs)(Cₛ)].
Chapter 8 The Capabilities of Managing Radical Service Innovation Project (LII)

Table 8.5: The Evolutionary Nature of the NPVR

<table>
<thead>
<tr>
<th>The Phases of the NPVR</th>
<th>The Related Competences</th>
<th>Problem-solving Operations and Technologies</th>
<th>Core-supplementary Combination Solution</th>
<th>Market Needs (Issues)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direction</strong></td>
<td></td>
<td></td>
<td>Two pilot projects that had no relation to the vehicle replacement idea were undertaken. There were obstacles giving rise to a <strong>very raw core solution</strong>: Vehicle Replacement. The key characteristics of the core solution (or more precisely the project components) were not clear.</td>
<td><strong>Abstract needs</strong>: (1) traffic in the GCR described as chaotic and undisciplined, and heavily congested for much of the day resulting in billions of Egyptian pounds in lost productivity and other economic costs; (2) most old vehicles were unsafe and polluting, and cause serious health problems; (3) the official tariff was discarded; and (4) most of the owners of this aging fleet of taxis could not buy safer and less polluting vehicles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Vehicle replacement components</strong>: - Enforcement; - Scraping; - Tariff restructuring; and - Financial incentive package.</td>
<td><strong>Solutions generated</strong>: - One-stop shop; - Layers of incentives; - National media campaign; and - White taxi.</td>
</tr>
<tr>
<td><strong>Incubation</strong></td>
<td>The related activity implementer’s competence</td>
<td>EEAA related; Auto dealers related; Gas company related; Banking related; Insurance related; MOI related; and Integration related.</td>
<td><strong>Solutions generated</strong>: - Enforcement; - Scraping; - Tariff restructuring; and - Financial incentive package.</td>
<td><strong>Issues specific to the tested implementation mechanism</strong>: - Bureaucracy; - Hardship; - Publicity; and - Visibility.</td>
</tr>
<tr>
<td>- Before live experimentating</td>
<td>The related employees’ competences</td>
<td></td>
<td><strong>Recommendations</strong>: - Stratify the program; - Establish a dedicated scrap-yard, and construct specialized recycling firm. Full enforcement to insure a regular supply of scrapped vehicles. - CDM-PoAs to get CER; and Carbon Finance.</td>
<td><strong>The weaknesses and threats of transition (acceleration)</strong>: - Supply of suitable vehicles (an obstacles); - Scraping and recycling undertaken by random, unspecialized junk workshops. Thus, the replaced vehicles (or their polluting components) might appear elsewhere in the world, or the scrapping operations might not be environmentally sound; and - Limited resources (e.g., for paying subsides and constructing facilities).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Ameliorative Innovation (e.g. making procedural changes to the mechanism by the managing entity)</strong>.</td>
<td></td>
</tr>
<tr>
<td><strong>Acceleration</strong></td>
<td>The related activity implementer’s competence</td>
<td>- MOF-Fund related; - Auto dealers related; - Gas company related; - Ad agency related; - Banking related; - Insurance related; - MOI related; - Recycling related; and - EEAA related.</td>
<td><strong>Reconstructing the core-supplementary combination solution components to reflect the solutions generated and some of the recommendations</strong>: - Full enforcement; - Layers of incentives; - One-stop shop; - Scraping; - Intermediate storage site; - Recycling; - Administration of the PoAs.</td>
<td></td>
</tr>
<tr>
<td>- Phase I</td>
<td></td>
<td></td>
<td><strong>Ameliorative Innovation (e.g. making procedural changes to the mechanism by the managing entity)</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Removing the ad component; Incremental innovation (adding more vehicle models; more loan tenures); and Incremental innovation (Bank Z with the cooperation of the managing entity developed the trailer replacement product).</strong></td>
<td>Source: Self.</td>
</tr>
</tbody>
</table>
8.3.4 The Dynamic Nature of Issues and their Solutions

This finding is concluded from table 8.5 (the incubation phase: before going live). As each new actor may be able to provide a solution, and, as such, reduce the current uncertainties, it also may cause new uncertainties to emerge. Thus, uncertainties fluctuate during the life cycle of the RI project. A member of the GDT pointed out that:

In the concept creation and concept development, we met to present and discuss issues and suggest solutions. The list of issues was dynamic. . . . As any new player could provide a solution for a specific issue, it would also pose constraints which required the search for new solutions. So, as the list of issues was dynamic, the list of solutions was also dynamic. (A, TM)

8.3.5 Incubation and Acceleration, Both Are Critical

The entrepreneurial behavior is a critical success factor that should be shown not only in the incubation phase, but also in the acceleration phase. Here, I will make a comparison between bank A and Z (table 8.6), followed by an attempt to understand why the radical innovator bank A did not catch the opportunity when transiting the financial product to operations.
## Table 8.6: A Comparison between Bank A and Z

<table>
<thead>
<tr>
<th>Bank A is better than bank Z in the following</th>
<th>Bank Z is better than bank A in the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Although the core <em>know-how</em> of the new financial product was simple (because of the limited role played by banks in the entire value chain), articulated (in protocols), and was not conceived as totally new (because it did not disrupt the established practices of auto loans), bank A was the key actor in the incubation phase, and was seen as the product owner, which did accumulate the know-how before all the competitors.</td>
<td>- The experience within the service environment (servicescape) in bank Z is better than in bank A. After privatization, bank Z has been able to change its inherited (public bank) servicescape, by giving more attention to the physical design of its branches, and other visual elements, like color and employees’ uniform.</td>
</tr>
<tr>
<td>- By being a key actor in the incubation phase, bank A was also able to accumulate step-functional learning with regard to the new, under bankable segment. In fact, this was well articulated by the statement made previously by one team member: it is “<em>with-the-product learning</em>” (word table 51).</td>
<td>- While bank A was adept at the incubation phase, bank Z was adept at the acceleration phase. This was obvious in the steps of: implementation (e.g., “hard launch”, word table 34); the creative media campaign (word table 35); personnel training (word table 37); and launch and review (especially the way by which the market was geographically expanded, word table 42). In other words, in the acceleration phase, <em>the receiving unit in bank Z had shown more entrepreneurial thinking than the receiving unit in bank A</em>. The way by which the capabilities of service production and delivery were leveraged and the market was expanded was the reason behind such a conclusion. Thus, although there were no unique core product benefits introduced by bank Z, the way by which the segment is penetrated by the <em>market offering</em> was unique.</td>
</tr>
<tr>
<td>- Bank A also played the role of consultant and kept the right to veto any of the protocol terms during the step of concept development in the acceleration phase. Thus, it had been playing a powerful role in this phase.</td>
<td>- While bank A has more than 400 branches and more than 1,000 ATMs, bank Z has nearly 200 branches, and 252 ATMs. Thus, the wide network of branches and ATMs was conceived as strength to bank A.</td>
</tr>
<tr>
<td>- While bank A has more than 400 branches and more than 1,000 ATMs, bank Z has nearly 200 branches, and 252 ATMs. Thus, the wide network of branches and ATMs was conceived as strength to bank A.</td>
<td>- While the new credit policy of bank A was set more than 6 years before the product launch, the credit policy of bank Z was set nearly 20 months before the product launch, after the <em>privatization at the end of 2006</em>. Thus, the operations of the former are generally described as well established, while the latter’s operations are not well established with many inefficiencies and customer complaints (as shown in word tables 40 and 41)*.</td>
</tr>
<tr>
<td>- Customer trust and brand awareness are also incomparable, and are consider as strength to bank A.</td>
<td>- <em>The adaptability of the credit staff to the new credit policy would take some time, and the fine tune of the procedures and the workflow would also take some time. Also, the banking operations have been recently engineered.</em></td>
</tr>
</tbody>
</table>

Source: Self.

---

* The adaptability of the credit staff to the new credit policy would take some time, and the fine tune of the procedures and the workflow would also take some time. Also, the banking operations have been recently engineered.
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It was, therefore, very important to understand why the receiving unit at bank A lacked the entrepreneurial behavior, and what the reasons motivated bank Z to show more entrepreneurial thinking when consolidating the market. Several explanations were provided to explain these behaviors.

Well, it is not . . . um. It is not a great market opportunity. It would be thousands of small clients added to a five-million customer base. And, one corporate customer is a substitute for these consumer clients. . . . So, it may not be logic to free money from the corporate portfolio and allocate it to thousands of consumer clients*. (A, Sen

* Please also recall the objection made by the corporate executive (word table 16).

Our Retail Banking Division is recently established . . . It does not have the capability, the confidence, and the aggressiveness of entrepreneurship. But let us be fair. Yesterday, the people in this division were introducing the soft financial products . . . visa card, master card, and personal loans. . . . Yes, any product based on template procedures is soft. . . . Yes, a template was developed for the taxi replacement product, but the segment was still new, and there were also new partners. (A, Mid

* Please also recall word table 8.

-It would be a valuable market opportunity that would triple our portfolio of the car loans. So, we identified a target, a commission, and stressed this target. And, it is an easy, pre-made opportunity. . . . It is also consistent with our Corporate Social Responsibility. (Z, Sen

-Socially responsible investments: It is our belief that investments must always give more weight to social and environmental criteria. . . . Responsibilities to the global community: We seek to influence the global scenario by giving utmost consideration to the issue of sustainable development. (Corporate Social Responsibility Strategy in Bank Z, November 2008: 6-8)

-It [bank A] is a public commercial bank. And, it had played its role in the pilot project . . . social corporate responsibility. You know, it is just like a syndicated loan. You [bank A] initiate, and let others participate. So the bank did have the desire to initiate, but lacked the desire to harvest. If it had the latter, it would capture a respectful market share, which should be the logic. This explains why bank . . . [A] waited the client’s visit, while bank . . . [Z] visited the client.

-When the operational efficiency of a bank is not high, the risk of defection with regard to new-to-the bank products will be high. This would have a serious impact on customer satisfaction, and, as such, the word-of-mouth. So, it is critical to design effective procedures for service recovery. Hence, you would be able to satisfy your client. . . . And, do not forget that each new ten satisfied clients would bring about seventy new clients to your door. . . . How we did know about that? It is from our experience base. There is an item in any product application asking about how you know about the product.

-Thus, bank . . . [Z] has been seen as the market dominator, although the operations of bank . . . [A] is usually characterized by being well-based. And, if you will ask any new client to go to bank . . . [A] because it introduces more benefits, he would say: Why the others did go to bank . . . [Z]? . . . What I mean is that bank . . . [Z] viewed the product as a profit and loss, attracted the clients, and treated them well in case of service failure. . . . This explains why the vehicle replacement product in Egypt was associated with the name of bank . . . [Z] rather than the
Thus, with regard to this product, it is concluded that bank A had the desire and capability to incubate, but lacked the desire and capability to accelerate the opportunity when transiting the product to operations.

8.4 The Capabilities of Radical Innovation Project Management

In this section, the capabilities of managing radical service innovation project, at the banking level, will be concluded, based on the previous findings. In Chapter 5, it was theoretically proposed that there would be three capabilities should be included in LII of the conceptual framework (direction capability, incubation capability, and acceleration capability). I found negative evidence regarding the direction phase. Thus, the direction capability will not be concluded, and only the incubation and acceleration capabilities will be presented.

8.4.1 The Direction Capability (Negative Evidence)

In Chapter 5, the direction phase is identified as the first phase of RI management. In this respect, the direction capability is defined as the behaviour, exploratory, and conceptualization skills and activities required to create (or recognize), elaborate, articulate, and initially evaluate opportunities for RIs (O'Connor and DeMartino, 2006; Story, et al., 2011). In the current research project, the direction phase represented the first phase in the process model for radical service innovation. The structure of this phase shows that there were four key steps: (1) setting objectives; (2) idea generation; (3) opportunity recognition; and (4) recommendations. The core of this phase was to: build the relevant capabilities; clarify the market needs; generate the breakthrough idea; justify the opportunity; and take a decision to go forward as an official innovation. Despite the importance of this phase, the direction capability will not be concluded for the reason mentioned below.

One central aim of the current research is to explain (develop causal propositions linking theoretical constructs). Moreover, one analytical tactics implemented to test the internal validity is chronology. In Chapter 5, it was theoretically proposed that the Core RIC would be an independent construct, and the direction capability would be a
dependent construct (P2A: the existence of the Core RIC is necessary for building the direction capability). Put it differently, the Core RIC must precede the direction capability. Thus, the events and activities related to the accumulation of Core RIC must precede the events and activities related to the accumulation of the direction capability. However, when chronologically documenting the case study, I have found negative evidence. (Please recall section 6.8.2.) During 2000-2005, while bank A had been building its R&D capability (one dimension underlying the Core RIC), its strategic partner (EEAA) had been building its direction capability. Thus, the accumulation of the direction capability was found to neither follow the Core RIC, nor be a capability on the banking level (as the direction phase was the responsibility of the strategic partner). In fact, the direction capability of the strategic partner was indirectly represented within the construct of cooperative (networking) capability (as mentioned in the footnote of word table 7/31). Based on the previous evidence, the direction capability will not be concluded, and must be removed from the conceptual framework.

It should be noted, however, that this finding is still consistent with past research in industrial innovation. Story et al. (2011) find that one supplier had played all the activities related to the direction phase. This is the case of the NPVR, in which a strategic partner of bank A had played all the activities of the direction phase. What is interesting, however, is that while the strategic partner had been building its direction capability, bank A had been building its R&D capability.

8.4.2 The Incubation Capability

In Chapter 5, the incubation phase is identified as the second phase of RI management. In this respect, the incubation capability is defined as the technical, market, and business model experimentation activities and skills required to mature and advance the articulated opportunity into a business proposal (O’Connor and DeMartino, 2006; Story, et al., 2011). In the current research project, the incubation phase represented the second phase in the process model for radical service innovation. Based on the findings presented in sections 1-3, several theoretical (second-order) constructs underlying the incubation capability will be concluded. Following this is conceptualizing this capability as a third-order construct.
8.4.2.1 Second-order Constructs Underlying Incubation Capability

Based on the previous findings, mainly related to the incubation phase, six theoretical (second-order) dimensions are concluded. These are: (1) assigning a new venture champion; (2) establishing the entrepreneurial frame; (3) formulation and preliminary design; (4) effective evaluation; (5) rapid prototyping and live experimenting; and (6) building and finalizing the business model. The following is a presentation for each theoretical dimension.

Assigning the New Venture Champion Construct

This capability is based on the finding presented in step one of the incubation phase. This finding shows that each actor (EEAA and bank A) assigned a champion to form and lead the development team of its institution. Regarding bank A, the champion assigned was the corporate credit executive (and board member). Word table 3.1 lists 11 personal characteristics of this champion. The first 10 attributes are related to the incubating role played by the champion while the last attribute is related to the integrating role.

Discussion

It is concluded that the new venture champion should possess several attributes that enable him (or her) to play two roles: incubating; and integrating. This finding is consistent with past research. The work of Leifer, et al. (2000: 72) provides support for the first role. They identify a set of critical attributes (e.g., superior technical know-how; comfortable with uncertainty; sufficiently flexible to be able to handle course corrections as progress unfold; seeing the job as one of “learning and leading”, rather than “controlling and managing”; and having incredible ability to sell their vision). The work of Story, et al. (2011) provides support for the second role. They find that the existence of a network champion is essential to coordinate and integrate among the actors involved in the network.

Assigning a New Venture Champion (Construct)

Based on the previous findings and discussions, this dimension is conceptualized as theoretical (second-order) construct manifested by two first-order factors, as shown in figure 8.1.
Establishing the Entrepreneurial Frame Construct

This capability integrates steps two (setting clear objectives) and three (team preparation) in the incubation phase. As shown in these two steps, statements like “national” project; “you are going to build a ship” (word table 5); “explore the implementation mechanism” with the “cooperation of current and potential participants” with regard to a “shapeless idea”, which is “more like a piece of jelly” (word tables 4 and 5) show that the champion of bank A did not only set a clear objective, but also gave the GDT the flexibility to explore the unknown and develop the “purely tailored” business model (word table 53), targeting the under bankable segment. In other words, while the champion set a clear objective with regard to the direction of the incubation phase (e.g., the opportunity pursued, the segment targeted), the means by which this strategic objective accomplished were left to the GDT.

Discussion

It is concluded from the previous findings that establishing the entrepreneurial frame at the start of incubation phase is essential. That is the champion leading and managing the RI project should not only identify the strategic direction of the project, but also give the development (incubation) team the flexibility to undertake the experimental activities that are essential to reduce the multiple uncertainties (e.g., technical and market), and expand the opportunity space. This is consistent with past research. Regarding the strategic goal, Salomo et al. (2007) find that, despite the fuzzy nature of the front-end phases, the TMT should clearly identify the strategic goal of the project, and that the stability of this goal is key to radical innovation success. Sundbo (1997) suggests that setting clear strategic goals is essential to prevent the innovation activities from becoming uncontrolled. Regarding the flexibility of means, several scholars find that RI occurs in a probabilistic setting due to the extremely high levels of uncertainties (O'Connor and DeMartino, 2006; Quinn, 1985; Story, et al., 2011; Veryzer, 1998). In this respect, Amabile (1998) McGrath and MacMillan (2000) argue
that, in such a probabilistic setting, flexibility regarding the means is critical to: create a sense of urgency, challenge, and ownership; and stimulate creativity.

**Establishing the Entrepreneurial Frame (Construct)**

Based on the previous findings and discussions, this dimension is conceptualized as theoretical (second-order) construct manifested by two first-order factors, as shown in figure 8.2.

![Figure 8.2: The Entrepreneurial Frame as a Second-order Construct](source: Self.)

Clarity of objectives means setting clear strategic objectives with regard to the official radical innovation project. Flexibility of means, on the other hand, means giving the development team the flexibility required to be able to discover the unknown and expand the opportunity space.

**Formulation and Preliminary Design Construct**

This capability integrates steps 4-6 in the incubation phase. As shown in step four (studying similar international projects), the teams started with a raw and shapeless idea, vehicle replacement. Thus, studying similar international experiences was critical to “find a start” for the project, and “prevent . . . reinventing the wheel” (word table 6). This may provide useful insights with regard to the components of the core-supplementary solution (Ys), and the implementation mechanism [(T)(C)(Ç)]. As shown in step five (concept creation), the teams started by clarifying the abstract market needs or issues (Ns), identified in the direction phase and summarized in table 8.5. The teams also suggested several solution components (Ys) that would satisfy these needs. This step suggests that the teams should recognize that the list of market issues and their solutions has a dynamic nature. New actors were joined to fill positions in the emerging business model. However, the inclusion of these actors implied integrating new experience bases, based on which new market issues were identified, and new solution components were suggested. The teams had to undertake several brainstorming sessions
(word table 8) to be able develop clear pilot project stakeholders’ roles and responsibilities (table 8.2), which in fact reflected building the ship concept discussed earlier (word table 5). As shown in step six (preliminary process design and integration), each team developed the internal process sought to satisfy its roles and responsibilities, and developed a very basic manual. Then, the teams had met several times to integrate these internal processes, and to develop a clear and strict whole workflow (word table 11 and table 8.3).

**Discussion**

The first finding suggests that integrating the international experience bases into the current project is essential as it may greatly enhance the concept creation step. Moreover, the second finding suggests the concept creation step is essential to develop the raw idea of replacement into a comprehensive description of the full concept. Furthermore, the third finding suggests that several processes and operations had to be designed and integrated into a clear workflow to be followed by all the actors, including the end customer. Past research provides support for these three findings. For example, in his process model for radical industrial innovation, Veryzer (1998) find that formulation (more akin to concept creation) and preliminary design are two essential steps in the development of discontinuous innovations. Moreover, Story, et al. (2011) find that the role of integrating is essential in the incubation phase.

**Formulation and Preliminary Design (Construct)**

Based on the previous findings and discussions, this dimension is conceptualized as theoretical (second-order) construct manifested by three first-order factors, as shown in figure 8.3.

**Figure 8.3: Formulation and Preliminary Design as a Second-order Construct**

<table>
<thead>
<tr>
<th>Second-order Construct</th>
<th>First-order Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation and Preliminary Design</td>
<td>Studying Similar International Experiences</td>
</tr>
<tr>
<td></td>
<td>Creating a Clear and Comprehensive Concept</td>
</tr>
<tr>
<td></td>
<td>Designing Preliminary Processes and integrating them into a Clear Workflow</td>
</tr>
</tbody>
</table>

Source: Self.
These three factors are found to be essential factors underlying the formulation and preliminary design construct.

**Effective Evaluation Construct**

This capability integrates steps seven and eight in the incubation phase. Step seven (business analysis or evaluation preparation) suggests that building a strong (complete and good) business case is essential, while step eight (project authorization) suggests that the evaluation should be entrepreneurial rather than managerial. Both are explained below.

**Preparing Strong (Complete and Good) Business Case**

The findings show that the GDT strived to prepare a complete business case covering not only the business implications of the opportunity, but also the whole story, including the roles and responsibilities of all the actors involved, and the need for extra effort to develop and test the replacement mechanism. To show the business implication, four tools were used: SWOT analysis; profitability analysis; sensitivity analysis; and stressing test. The business case was not only complete, but also was compelling and based on “clear and logical assumptions” (word table 14). The strengths were identified and tied to the opportunities. The weaknesses and threats were recognized and made explicit, and the GDT showed how they would be mitigated and/or neutralized through not only the internal process of the bank, but also the whole implementation mechanism. Moreover, as shown in word table 17, the presentation was based on the power of persuasiveness, and the team reiterated that the project was “pilot”, and stated explicitly that “learning” was a main goal, and the introduction of something “wow” to “pioneer” new promising direction was another main goal.

**Entrepreneurial and Constructive Evaluation**

The findings show that the TMT (or the Board of Directors) plays a critical role when evaluating radical innovations. The findings show that evaluating incremental innovation is based on “template procedures” as “the product has history”. The evaluation process, thus, is a “routine”. Radical innovations, on the other hand, “do lack history” (word table 14), and, as such, it should be evaluated constructively. That is the TMT should try to enhance its conceptualization, e.g., to “improve” the process; and “discover any leak” (word table 15). Moreover, the TMT should show a high deal of “imagination”, especially when the innovation is located in the open space, away from
the traditional position occupied by the bank (word table 14). In addition to the constructive evaluation and high deal of imagination, the evaluation panel should be risk taker and have strong orientation to experimentation (word table 15).

**Discussion**

The findings suggest the effective evaluation of radical innovations requires: building strong (complete and good) business case to justify the continuation of the project; and that the evaluation process should be entrepreneurial and constructive (e.g., improving the conceptualization of the product, and having strong orientation to uncertainly and experimentation). Past research provides supports for these findings. Regarding the complete and good business case, Veryzer (1998: 315) finds that, despite the great deal of uncertainty associated, the development team prepare for formal reviews by developing “a strong case for continuing the project”. Moreover, Salomo, et al. (2007) also find that the team should conduct an initial risk analysis to address the risk, and show how the extremely high levels of technological and market uncertainties will be overcome. Regarding the TMT evaluation, Ayers (2005) argues that the evaluation process should be entrepreneurial rather than managerial, one that have strong orientation to uncertainty, experimentation, and opportunism. The main difference between the current research project and past research is that while the process data show that these two factors are identified as critical in the incubation phase, past research finds that they are critical in the direction phase.

**Effective Evaluation (Construct)**

Based on the previous findings and discussion, the effective evaluation capability is conceptualized as a second-order construct manifested by two first-order factors as shown in figure 8.4.

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**Figure 8.4: Effective Evaluation as a Second-order Construct**

![Effective Evaluation Diagram]

Source: Self.
Rapid Prototyping and Live Experimenting Construct

This capability integrates steps nine, ten, and the first part of step eleven in the incubation phase. Step nine (rapid implementation or prototyping) shows that the teams sought to develop and design a crude prototype for the physical implementation. Bank A, for example, “designed [“the process”] to make the best use of the current resources”. The team translated the operational procedures into a periodical-like, and identified only two branches to introduce the financial product. Such rapid implementation “eliminated the training required” and “the need for an advanced IT system required to follow the product performance” (word table 18). Thus, although the roles and responsibilities of each actor, including the customer, were identified clearly, the vectors (T) and C) of the replacement mechanism were generally described as crude, in which efficiency was not a major concern. The main goal, however, was to go live to probe-and-learn. This was obvious through many word tables, e.g., word table 18 (“It is a pilot project, so reduce the cost as much as you can”); word table 46 (“We knew that the process was inefficient. But, it was not our intention to improve something without knowing it first”); and word table 47 (“We cannot enter new segment with a new product just based on our assumptions. We may lose the money. So, we need to test our assumptions through a small scale project with a small amount of authorized money”).

The findings related to step ten (launch and review or live experimenting) and the first part of step eleven (solution generated) suggest the following factors: close and continuous monitoring; flexibility; open communications among partners; and synthesizing the step-functional learning accumulated. Regarding the close and continuous monitoring, the findings (word table 20) show that each partner involved in the launch and review step was responsible for closely monitoring its process, including its service encounter. Close and continuous monitoring for the service encounters was critical due to the high number of service encounters the customers must deal with, and the difficulty these customers might face when articulating their experience with such a complex process. Also, measuring the market sound and reaction with regard to the solution components was critical to validate the assumptions based on which these components were developed. Regarding flexibility, this factor was important as it enabled the related players to test several scenarios. Testing “the notion of the mass production” (word table 19) is a case in point in which the case-by-case operations initially designed were replaced by the group-operations. If one or more of the players lacked such flexibility, such a scenario would not be tested. Regarding the open
communications among partners, word tables 19 and 20 suggest that this factor was important to share experiences; smooth the back-and-forth workflow; and move the newly grouped (batch) operations along this workflow. These open communications were further enhanced by the pilot project coordinator, the EEAA. Regarding synthesizing the step-functional learning accumulated, the first part of step eleven shows that, due to the complexity of the replacement process (series of encounters) and as such the issues identified during the live experimenting, it was critical to crystallize and move the learning accumulated from the actor-level to the network-level. Thus, several brainstorming sessions had been conducted by the Kfw to combine and socialize the learning accumulated, and generate solutions for the issues identified during step eleven.

Discussion
The findings suggest that rapid prototyping and live experimenting are at the core of the incubation phase, in which the teams quickly implement the paper prototype (vectors (T) and (C)) by developing crude prototype, and go live to experiment, learn about the market, test assumptions, and modify the prototype. These findings are consistent with past research. For example, Veryzer (1998: 316) finds that the majority of radical innovators seek first to develop an “exploratory” prototypes, which are not elaborate, being built from existing systems and components to provide a platform for early applications of the new and unproved technology. He also finds that the prototype phase is followed by “testing and design modification” phases, in which the teams seek to test and modify the technology. Here, the focus is on evaluation and validation of the technical solutions. After re-evaluating the specifications, making the necessary adjustments, and reaching a stable design, the team goes live in a limited customer tests. The aim is not only to evaluate the technical characteristics of the product, but also test assumptions regarding specifications and customer needs. von Hippel (1994: 434) calls this approach the “rapid prototyping method” that has the ability to capture the “sticky information” related to the customer latent needs. O'Connor (1998) identifies this mechanisms as the best one to learn about markets for radical innovation. Leifer, et al. (2000: 82) find a similar mechanism, and argue that “a prototype is a mechanism for teaching the market . . . and for learning from the market”. Finally, the factor of synthesizing the step-functional learning accumulated reflects the knowledge creation process, or more precisely the knowledge spiral process. Nonaka and Takeuchi (1995: 13) call this “from personal to organizational knowledge”. Thus, in the current work,
the actor-level resembles the personal knowledge, and the network-level resembles organizational knowledge.

**Rapid Prototyping and Live Experimenting (Construct)**

Based on the previous findings and discussions, this construct is conceptualized as a second-order construct manifested by five first-order factors as shown in figure 8.5.

![Figure 8.5: Rapid Prototyping and Live Experimenting as a Second-order Construct](source: Self)

The findings suggest that the lack of any first-order factor in this construct would waive the core advantage of the rapid prototyping and live experimenting.

**Building and Finalizing the Business Model Construct**

The conceptualization of this capability is concluded from: the second part of step eleven (the way forward proposals) of the incubation phase; step twelve in the incubation phase (the identification of the managing entity); and the first two steps in the acceleration phase (concept development and process redesign). Also, the massive expansion (the main weakness of the NPVR mentioned in the post-analysis findings (section 8.3.2)) will be taken into consideration. The findings suggest that three factors are essential. These are: understanding and experimenting with the entire value chain; identifying the weaknesses and threats of the acceleration phase; and designing strict partnership agreements. The following is a presentation for each factor.
Understanding and Experimenting with the Entire Value Chain

The success of the pilot project and the notion of the PoAs opened the opportunity of the CDM registration and finance, and the possibility to generate revenues from the selling of the Emission Reduction Units certified by the CDM Committee. However, a new key role had been needed. It was the managing entity. Regarding the managing entity itself, several alternatives had been studied and the key project teams had been gradually able to identify the most eligible alternative (word tables 25 and 26). Another key role had been added through which the scrapped vehicle treated as an asset. It was the recycling firm. The recycling operations were also essential to insure that scrapped vehicles would not appear again anywhere in the world. A third new key role had also been added to move the product in a manner that is profitable to the customer. It was the ad agency. Thus, the sort of the value chain which should be built before the innovation can be successfully commercialized requires clear understanding and identification of the entire value chain. However, such clear understanding and identification may require experimentation with regard to new positions in the value chain, and the actors that would fill these new positions.

Identifying the Weaknesses and Threats of the Acceleration Phase

The findings also show that the weaknesses and threats inherent in each position in the entire value chain should be identified and the related recommendations should be clearly articulated. In other words, the capability gap with regard to all players in each position should be identified and seen as bottleneck, and the threats these incapable players may cause to other positions in the value chain, including the end user, should be mentioned clearly.

Designing Strict Partnership Agreements

The findings show that the way forward proposals prepared by the EEAA and Kfw effectively addressed the weaknesses and threats of the acceleration phase of the NPVR, and provided clear recommendations (e.g., word table 24). Unfortunately, some key players neglected some valuable recommendations in a way that caused troubles to all the players in the value chain. This suggests that all players in the value chain must be committed to these recommendations, and the project expansion must keep pace with the capability leveraging effort of incapable players (e.g., the ad agency, and auto dealers). Strict commitment is particularly required if there is only one player that could
fill in a position in the value chain, and this player would play a *controlling rule*. The managing entity is a case in point.

**Discussion**

This capability seeks to build and finalize the business model (the entire value chain). It is essential as it seeks to address critical issues related to the infrastructure required for successfully moving the product to the acceleration phase in a manner that is both easy and convenient for customers and profitable for the radical innovator and its partners. The findings suggest that this capability is captured by three factors: understanding and experimenting with the entire value chain; identifying the weaknesses and threats of the acceleration phase; and designing strict partnership agreements.

The first two factors are consistent with the innovation literature. Leifer *et al.* (2000: 107), McDermott and O'Connor (2002), and O'Connor and DeMartino (2006) state that incubation phase is not complete until the business proposal includes one or more business models. They also suggest that keys to effectively build a business model are to understand the entire value chain and to follow the “probe-and-learn” approach when developing this business model. In a similar vein, McIntyre (1988) and Afuah and Bahram (1995) argue that the radical innovators should take into consideration the impact of the innovation on the various stages of the value chain as this has critical implications for whether the innovation finally achieves widespread adoption or not, and also the speed with which adoption of an innovation takes place. The third factor, however, is grounded on the evidence found in the NPVR.

**Building and Finalizing the Business Model (Construct)**

Based on the previous findings and discussions, building and finalizing the business model capability is conceptualized as a second-order construct manifested by three first-order factors as shown in figure 8.6.
The empirical findings suggest that the lack of one factor in this second-order construct reduces the value produced from its complements.

8.4.2.2 Incubation Capability as Third-order Construct

In Chapter 4, I have shown that incubation is an essential capability within the project management capability framework (O'Connor and DeMartino, 2006; Story, et al., 2011). I have also shown that there is a lack of conceptual or empirical research sought to further elaborate and develop the lower-order dimensions of this capability. In Chapter 5, I have proposed that the incubation capability needs to be captured by three dimensions: (1) assigning a new venture champion; (2) developing an effective plan for reducing the technical and market uncertainties; and (3) building and finalizing the business model. However, by longitudinally and qualitatively investigating this capability, I have been able to identify six theoretical (second-order) dimensions. These are: (1) assigning a new venture champion; (2) establishing the entrepreneurial frame; (3) formulation and preliminary design; (4) effective evaluation; (5) rapid prototyping and live experimenting; and (6) building and finalizing the business model. Thus, the incubation capability is conceptualized as shown in figure 8.7.
8.4.3 The Acceleration Capability

In Chapter 5, the acceleration phase is identified as the third phase of RI management. In this respect, the acceleration capability is defined as the exploration and exploitation activities and skills required to ramp up the fledgling business to a point where it can stand on its own relative to other business platforms in the ultimate receiving unit.
(O’Connor and Ayers, 2005; O’Connor and DeMartino, 2006; Story, et al., 2011). In the current research project, the acceleration phase represented the third phase in the process model for radical service innovation. Based on the findings presented in sections 1-3, several theoretical (second-order) constructs underlying the acceleration capability will be concluded. Following this is conceptualizing this capability as a third-order construct.

8.4.3.1 Second-order Constructs Underlying Acceleration Capability
Based on the findings related to the acceleration phase, three theoretical (second-order) constructs are concluded. These are: (1) managing the transition to operations; (2) implementation; and (3) introduction. The following is a presentation for each construct.

Managing the Transition to Operations Construct
The conceptualization of this capability is concluded from the findings of steps three (transition decision and project authorization) and four (implementation) of the acceleration phase. The findings suggest that three factors are essential. These are: assembling a transition team, assigning (push and pull) transition champions, and assessing the transition and integration readiness. The following is a presentation for each factor.

Assembling a Transition Team
Regarding bank A, as the product was transited to another division to be responsible for managing it from a to z (word table 32), the formation of a cross-division team was important to handle the transition process. The new team involved members form the GDT (the product owner), carrying the knowledge base accumulated during the incubation phase, and members from the receiving unit (auto finance), carrying the experience base of this unit. Including some members of the GDT was critical and could not be replaced by just sending the articulated knowledge, the product file (word table 32). The team also involved a transition expert. This was the manager of the Home Gas Connection Unit. Although, this manager had no relation to auto finance, he had been involved in several transitions (word table 7/9).
Assigning (Push and Pull) Transition Champions

Regarding bank A, there is evidence that there were two transition champions: a champion form the TMT to push the innovation, which was the VC; and a champion from the receiving unit to pull the innovation, which was the head of the Auto Finance Unit. The VC’s push was important to mitigate the resistance, especially from the GDT (word tables 29-31). The Auto Finance Unit Head’s pull was important as the implementation process involved the establishment of a new organizational unit (Taxi Unit) and new branch (the representative branch at the one-stop-shop). Articulating the value of the innovation for the receiving unit is another responsibility for the pull champion. While this was not obvious in bank A, it was evident in bank Z (word table 57: “It would be a valuable market opportunity that would triple our portfolio of the car loans”).

Assessing the Transition and Integration Readiness

There is no evidence that a formal, systematic approach was followed by both banks A and Z when assessing the transition and integration readiness. Rather, the assessment of the transition readiness was made in ad hoc, less formal way. Regarding bank A, the transition readiness was undertaken by the VC when making the transition decision. The decision to move the product form the SMEs Division (where the weaknesses in terms of IT were) to the Retail Banking Division (where the strengths in terms of IT were) was intended to make the process more efficient, more reliable, and more flexible (word table 30). It was intended to make the best use of organizational resources. Regarding bank Z, the developers considered only the type of branches selected for launching the new product, and also the impact on the current customers (word table 34: “It was critical to select branches in popular neighborhood instead of advanced ones”).

Discussion

The findings suggest managing the transition to operations as an essential, first step in the acceleration phase. Three factors are found to be critical: (1) assembling a transition team, including members from the incubation team, members from the receiving business unit, and a transition expert; (2) assigning two transition champions, one from the TMT of the bank to push the innovation and one from the receiving business unit to pull the innovation; and (3) assessing the transition and integration readiness in ad hoc, less formal way.
The first two findings are consistent with past research. Regarding the first finding, several scholars argue that the transition team should include members from the incubation team, members from the receiving business unit, and a transition (or change) expert. Regarding the second finding, several scholars argue that having two transition champions is essential. Taken together (transition team and champions) foster the transition and adoption process and increase the willingness to cannibalize, through reducing resistance, completing technical and market development of the radical innovation in an effective way, and encouraging the receiving unit to stretch (scale up) its capabilities to suit the innovation requirements (Adler, 1995; Chandy and Tellis, 1998; Ettlie, et al., 1984; Herrmann, et al., 2006; Morris and Westbrook, 1996; O'Connor, et al., 2002). The third finding, however, is not consistent with past research. While I find that assessing the transition and integration readiness has been undertaken in ad hoc, informal way, past research strongly suggest that assessing the transition readiness should be undertaken in a formal, systematic way. It is understood that the Retail Banking Division of bank A did not conceive the innovation as a market opportunity (e.g., word table 55). However, there is no evidence that the developers at bank Z, which conceived the innovation as a market opportunity, followed a formal, systematic approach. It is true that the innovation did not represent maximal challenges to the current service system, as the innovation was not conceived as radical at the banking level. But, it is also true that, as Tax and Stuart (1997) and O'Connor, et al. (2002) argue, following a more formal, systematic approach intended to develop a comprehensive transition plan will reduce many of the residual uncertainties associated to the acceleration phase.

Managing the Transition to Operations (Construct)

Based on the previous findings and discussions, managing the transition to operations capability is conceptualized as a second-order construct manifested by three factors as shown in figure 8.8.
Implementation Construct

The conceptualization of this capability is mainly concluded from the findings of steps 4-6 (implementation, media campaign, and personnel training) of the acceleration phase. The findings suggest that three factors are essential. These are: (1) physical implementation; (2) well-designed media campaign; and (3) personnel training, evaluation, and compensation. The following is a presentation for each factor.

Physical Implementation

Based on the findings of the case study, the transition team should develop the various components of the (T) vector. The team should: (1) complete the (front- and back office) operations development, including the operations of the new organizational units established to service the innovation (the representative on-site branch); (2) translate those parts of the operations that will be handled through technological medium; (3) develop the service recovery procedures; and (4) identify the number of branches that will be involved in the hard launch. The last two factors deserve more attention with regard to bank Z. The development of the service recovery procedures was critical because the development process was crashed (word table 39), and the credit policy was not well-established (as shown in table 8.6). Thus, inefficiencies were inevitable. While bank A made a decision to enter the market through “soft launch” followed by roll-out, due to the lack of confidence (word tables 33 and 56), bank Z bypassed the soft launch, and laid the groundwork for big market by making a “hard launch” (word table 34). The hard launch was critical to catch the market opportunity, taking into consideration that competitors were launching their products simultaneously.
Well-designed Media Campaign

The findings of the case study show that a well-designed media campaign should: (1) inform the customers about the product features and capabilities; (2) have significant educational content; (3) stimulate the word-of-mouth and referral behaviors; (4) be consistent across the various production and marketing channels; and (5) be transmitted through the media most suited to reach the intended segment (e.g., word tables 35 and 58). Bank Z was creative in its media campaign, especially with regard to the last factor. It used the most interactive communications form, the personal selling. This enabled bank Z to not only neutralize the known product capabilities of bank A, but also be proficient in implementing the 2nd and 3rd factors. In fact, the 2nd factor facilitates the accumulation of customer competences, the (C) vector.

Personnel Training, Evaluation, and Compensation

The Retail Banking Division of bank A used less interactive, less formal forms of training (“all-members email attached by the product periodical”; “hot phone number to answer the employees inquires”; and “the in-between employees training”, as shown in word table 36). However, a more formal and interactive form of training is critical because: it facilitates the accumulation of employees’ competences, the (C) vector; it does not leave much to chance (which may cause heterogeneity in performance, and thus, low quality levels); and it is effective when the front-line employees are assumed an educational role. Bank Z, on the other hand, followed more formal, interactive form of training for all employees involved in the production and delivery of the new service, especially the front-line employees (word table 37). The findings related to bank Z also show that designing suitable performance metrics and rewards should be taken into consideration in addition to personnel training (word table 57: “So, we identified a target, a commission, and stressed this target”).

Discussion

This capability is of particular importance due to the lack of a formal and systematic assessment for the transition and integration readiness. The findings suggest that three factors are essential to build the implementation capability. These are: (1) physical implementation; (2) well-designed media campaign; and (3) personnel training, evaluation, and compensation. Bank Z was very creative in this step to the extent that the vehicle replacement product was associated with the name of bank Z rather than the name of bank A (word table 58 and table 8.6). As such, the way by which bank Z
managed the implementation step has contributed significantly to the conceptualization of the implementation capability. The first factor includes completing the development work, translating those parts of the operations that will be handled through technological medium, developing the service recovery procedures, and carefully identifying the branches involved in the initial introduction. The second factor includes designing a media campaign with significant educational content, seeking to stimulate the word-of-mouth and referral behaviors, and being transmitted through the media most suited to reach the intended segment (personal selling). The third factor includes designing formal and interactive training program for all people involved in the production and selling of the new service, and designing suitable performance metrics and rewards.

The majority of indicators underlying the three first-order latent factors are consistent with past research, e.g., completing the development work; implementing the operations and the associated technologies, undertaking extensive training for personnel producing, delivering, and selling the (radically) new service; setting new products revenue targets; finalizing the marketing communication tools (involving significant educational content) (Atuahene-Gima, 1996; Cooper and Edgett, 1996; Cooper and Kleinschmidt, 1986; Drew, 1995; Johnson, et al., 2000; O'Connor, et al., 2002; Scheuing and Johnson, 1989; Story, et al., 2011; Thomke, 2003; Veryzer, 1998). However, two indicators are found to be lacking: recruiting and training partners participating on the production and delivery of the new service; and undertaking a pilot (off-line) run to get the new service system working smoothly (Djellal, et al., 2003; O'Connor, et al., 2002). While the former is essential, it was found to be the responsibility of the managing entity. Moreover, I found that bank Z had replaced the pilot run with a fast adaptive control system during the launch (explained latter).

**Implementation (Construct)**

Based on the previous findings and discussions, the implementation capability is conceptualized as a second-order construct manifested by three latent factors as shown in figure 8.9.
Introduction Construct

The conceptualization of this capability is concluded from the findings of step 7 (launch and review) of the acceleration phase. The findings suggest that two factors are essential. These are: (1) designing fast adaptive control system; and (2) replicating capability. The following is a presentation for each factor.

Fast Adaptive Control System

The findings related to bank Z shows that the hard launch was associated with fast adaptive control system. This system was based on continuous monitoring (or daily watch) during the first three months of product launch, seeking to identify and correct errors, and incorporate the newly acquired (market) learning into the system of vectors, especially the process. This control system enabled bank Z to produce substantial improvement through “process reengineering”, which led to a well-based process (word table 39).

Capability Replication

The findings also show that developing the well-based process facilitated extending the market in an evolutionary manner. As shown in word table 41, whenever a decision for a geographical expansion was considered by bank Z, the successful “main branch”, which had been able to achieve the target and accumulate learning, was responsible for replicating success in other branches in the same zone, and the manager of this main branch was “compensated as such”. In fact, this main branch was assumed the role of “product owner” in this zone. Thus, phasing the product introduction through soft-launch (very limited set of branches) followed by roll-out (as the case of bank A) was not seen as an effective entry mechanism by bank Z. In other words, when there is no response lag (as in the current case study), or when the response lag is expected to be
This introduction mechanism (fast adaptive control system associated by capability replication) is considered to be more effective by bank Z.

Discussion
In the financial product of vehicle replacement, three banks had signed a protocol to participate in the acceleration phase. These banks had introduced their financial products at same time. However, when mobilizing the dissemination process, bank Z had followed evolutionary strategy. The bank crashed the development process, and designed a fast adaptive control system that resulted in process reengineering. This system was followed by capability replication. These two findings are consistent with past research. Tax and Stuart (1997: 128) find that service firms follow what they describe as “an evolutionary process, with considerable learning and reengineering of the design after the initial introduction”, followed by a gradual dissemination to the service. This is more akin to what Urban and Hauser (1993) call the fast adaptive control system, in which the launch process is monitored carefully to identify and correct errors and gaps to make sure that the new product is well-based before gradually rolling out the product. In this respect, a well-based process facilitates the establishment of “routine” in the terminology of Nelson and Winter (1982), which requires “ameliorative innovation” in the terminology of Gallouj (2002). (This type of innovation was also implemented by the managing entity. As shown in table 8.5, the ameliorative innovation through making procedural changes started in phase I of the acceleration phase.) Establishing the routine facilitates what Nelson and Winter (1982: 123) call routine “replication”, and what Grant (2002) call capability replication or “copy exactly”. This is also consistent with transferring best practices within the firm as the source (the main branch) was motivated and was seen as reliable (Szulanski, 1996).

Introduction (Construct)
Based on the previous findings and discussions, the introduction capability is conceptualized as a second-order construct manifested by two factors as shown in figure 8.10.
8.4.3.2 Acceleration Capability as a Third-order Construct

In Chapter 4, I have shown that acceleration is an essential capability within the project management capability framework (O'Connor and DeMartino, 2006; Story, et al., 2011). I have also shown that there is a lack of conceptual or empirical research sought to further elaborate and develop the lower-order dimensions of this capability. In Chapter 5, I have proposed that the acceleration capability needs to be captured by three dimensions: (1) managing the transition to operations; (2) implementation; and (3) introduction. In this respect, by longitudinally and qualitatively investigating this capability, I have been able to elaborate and develop the lower-order dimensions of this capability, as shown in figure 8.11.
8.5 Summary

This chapter has presented the findings, discussions, and conceptualization of the project management capabilities (Layer II of the conceptual framework). By chronologically documenting the NPVR (2001-2010), I have been able to develop a process model for radical service innovation management. In this respect, three phases are identified: direction; incubation; and acceleration. These three phases include 23 steps. I have also reported the findings of taxi owner/driver experience undertaken to incorporate customer insights and triangulate the evidence. I have also conducted a second-level analysis, and have concluded a set of post-analysis findings intended to service the conceptualization process. Based on the findings presented in the previous three sections, I concluded the capabilities of radical innovation project management. Although the direction phase is chronologically documented and presented, I found negative evidence that forced me to eliminate it from the conceptual framework. Thus, the direction capability was not concluded. I have concluded only the incubation and acceleration capabilities. Each capability is conceptualized as a theoretical (third-order) construct, which is manifested by a set of second-order dimensions, each of which is manifested by a set of first-order factors. The total number of these first-order latent factors is 25.

In Chapter 9, the findings, discussions, and conceptualization of the success/performance measurement of radical service innovation (Layer III of the conceptual framework) will be presented. (Please note that all the research propositions will be developed in Chapter 10.)
Chapter 9 The Success/Performance Measurement of Radical Service Innovation (LIII)

The aim of this chapter is to present the findings, discussions, and conceptualization of the success/performance measurement of radical service innovation. This chapter is organized in six sections. Section one presents the findings related to the temporary competitive advantage (TCA). Section two presents the findings related to the sustainability of this TCA, which includes sustainable competitive advantage (SCA) and imitation barriers. Section three presents the findings related to superior long-term financial performance. Section four discusses the previous findings. Section five suggests a conceptualization to this layer of the conceptual framework. In section six, a summary will be provided.

9.1 The Temporary Competitive Advantage (TCA)

As discussed in Chapters 4 and 5, the TCA is defined in terms of two main components: (1) the relative customer perceived value of the market offering; and (2) the relative cost of developing, producing, and delivering this market offering. These two components should be taken into consideration to be able to identify whether the capability possessor has established effectiveness (differentiation) advantage, efficiency (cost) advantage, or effectiveness-efficiency advantage. When doing so, two competitive situations will be analyzed. The former is related to the financial product of vehicle replacement, and includes banks A and Z. The latter is related to the private banking product, and includes banks D, E, and F. Thus, the findings of the two competitive situations will be presented and discussed in view of these two main components of TCA.

9.1.1 The Financial Product of Vehicle Replacement

Bank A, which has led the incubation phase, has not generated TCA. Rather, the creative imitator bank Z, which has joined only the acceleration phase, has been able to establish a TCA.
9.1.1.1 The Relative Customer Perceived Value

Regarding the vehicle replacement product, the characteristics of the majority of the targeted (under bankable) segment suggest that value is low price (interest rate). When the price is equal, as the case in acceleration phase (Phase I), the client would most likely accept the market offering that provides more value propositions if s/he perceives them. As shown in the step of media campaign (8.1.3.5), bank A highlighted the following four product capabilities: (1) speed; (2) easier procedures; (3) the largest network of traditional and alternative channels for the loan repayments; and (4) the flexibility of these repayments (through the CardPac). The developers at bank A believed that the value propositions introduced were better than the competitor banks’.

The auto finance manager of bank A made the following comment:

1 We have been able to create more customer value than our competitors.
- Speed is appreciated by this customer. It provides a psychological benefit for someone who is afraid from finance and its obligations.
- Easier procedures are also appreciated, taking into consideration the highly complex process.
- We have placed our strengths at the disposal of our client through the CardPac. The client can deposit the repayment at the P.O.S machine at any branch, or at any ATM, and on more than one part during the first two weeks of the month, which is more relevant to and highly appreciated by such segment with such income pattern. Also, although most of these clients have preferred to pay through the P.O.S at the teller and not to use the ATMs, this has reduced the waiting time at the teller. . . . In fact, the CardPac is like the master key opening all our strengths to the customer. (A, Mid3)

Thus, the CardPac and the flexibility advantage it provides is identified as a major strength of the bank A’s product. However, the team at bank Z (which actually was not aware about the previous product characteristic) has different belief, as shown below.

2 But, I do not see any advantage from providing an ATM deposit card. In fact, this segment appreciates personal interaction. It feels safer when another hand receives the repayment, and fears that the money may be miscounted if the machine received it. . . . And, by the way, personal interaction is more beneficial to be able to identify the customer needs, and, as such make cross-selling. In fact, I do not see any link between this feature and the targeted segment. (Z, Sen2)

It is important to pull together the value propositions (benefits) introduced by both banks, and show how bank Z was able to waive the value propositions produced by bank A. In word table 3, I will compare between banks A and Z according to the seven first-order latent factors underlying the construct of customer perceived value (discussed in details in section 5.4.1).
Word Table 3: The Relative Customer Perceived Value

<table>
<thead>
<tr>
<th>Factor</th>
<th>Bank</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installations</td>
<td>-Traditional Servicescape,</td>
<td>-Modern Servicescape, private bank</td>
</tr>
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<td></td>
<td>public bank (table 8.6)</td>
<td>(table 8.6)</td>
</tr>
<tr>
<td>Professionalism</td>
<td>-No formal training sessions</td>
<td>-Good (formal and systematic) training</td>
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<td></td>
<td>had been conducted (word</td>
<td>for all the people participating in</td>
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<td></td>
<td>table 8/36)</td>
<td>producing, delivering; and selling the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>new product (word table 8/37).</td>
</tr>
<tr>
<td>Quality</td>
<td>-Speed (due to operational</td>
<td>-Initially, the bank sought to “reduce</td>
</tr>
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<td></td>
<td>efficiency and being first-</td>
<td>the expectation with regard to speed”</td>
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<tr>
<td></td>
<td>leaner through the</td>
<td>(word table 8/40). Moreover, the bank</td>
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<td></td>
<td>participation in the</td>
<td>designed service recovery procedures</td>
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<td></td>
<td>incubation phase).</td>
<td>so that clients get “satisfied at the</td>
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<td></td>
<td>-Easier procedures.</td>
<td>end” (word tables 8/40 and 8/58).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Finally, the bank had undertaken “process</td>
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<td></td>
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<td>reengineering” during the hard launch</td>
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<td></td>
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<td>to simplify the procedures (word table</td>
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<td></td>
<td></td>
<td>8/39).</td>
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<tr>
<td>Functional</td>
<td>-The advertised price is 6.5</td>
<td>-The same.</td>
</tr>
<tr>
<td>Value Price</td>
<td>percent cut interest rate.</td>
<td></td>
</tr>
<tr>
<td>Emotional</td>
<td>-Traditional marketing</td>
<td>-Creative marketing campaign</td>
</tr>
<tr>
<td>Value</td>
<td>campaign (two main types of</td>
<td>characterized by:</td>
</tr>
<tr>
<td></td>
<td>advertising media were</td>
<td>-Personal selling, more personal and</td>
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<tr>
<td></td>
<td>chosen):</td>
<td>friendly channel (word table 35);</td>
</tr>
<tr>
<td></td>
<td>-Print (newspapers, and</td>
<td>-“Significant, attractive, and easy-go</td>
</tr>
<tr>
<td></td>
<td>brochures); and</td>
<td>educational content” (word table 8/35)*.</td>
</tr>
<tr>
<td></td>
<td>-Out-door media (billboards</td>
<td>-Print (newspapers, and brochures); and</td>
</tr>
<tr>
<td></td>
<td>and ads on exteriors of the</td>
<td>-Out-door media (billboards and ads on</td>
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<td>new taxis).</td>
<td>exteriors of the new taxis).</td>
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<tr>
<td>Social value</td>
<td>-The largest cliental base</td>
<td>-Stimulating “the word-of-mouth and</td>
</tr>
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<td></td>
<td>in Egypt (word table 8/12).</td>
<td>referral behavior” (word table 8/35);</td>
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<td></td>
<td></td>
<td>-“There is something you should take</td>
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<td>into consideration in this case. As</td>
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<td></td>
<td></td>
<td>bank . . . [A] did not communicate its</td>
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<td></td>
<td></td>
<td>product benefits well, and bank . . . [Z]</td>
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<td></td>
<td></td>
<td>made every effort to attract the</td>
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<td>segment, the heard mechanism would be</td>
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<td></td>
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<td>effective . . . try to catch the early</td>
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<td></td>
<td></td>
<td>adopters and promote the word-of-mouth,</td>
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<tr>
<td></td>
<td></td>
<td>and you would win the competition game.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>And, if you will ask any new client to</td>
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<tr>
<td></td>
<td></td>
<td>go to bank . . . [A] because it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>introduces more benefits, he would say:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Why the others did go to bank . . . [Z]?”</td>
</tr>
</tbody>
</table>
|                 | -Stimulating “the word-of-mouth and referral behavior” (word table 8/35); | (B, Sen.)
| Satisfying      | Providing finance to under-|                                        |
| unmet customer  | bankable segment (e.g., word|                                        |
| needs           | tables 2 and 17).          |                                        |
|                 | -The same.                 |                                        |

Source: Self.

* Please note that I assume that the use of the more personal and friendly channel and the significant, attractive, and easy-go educational content will provide psychological benefits to the under bankable segment (which is afraid from finance and its obligations) with regard to a very complex process, and thus the customer, as suggested by Roig et al. (2006), will feel relaxed, and at easy.

As bank Z “has been seen as the market dominator”, and “the vehicle replacement product in Egypt was associated with the name of bank . . . [Z] rather than the name of bank . . . [A]” (word table 8/58, please also see table 9.1), it is concluded that the value (benefits) produced by bank Z are perceived, desired, and appreciated by the majority of this customer segment. In short, it is concluded that bank Z has been able to produce superior customer perceived value than bank A. Having analyzed the relative customer perceived value, bank Z has been able to produce value that surpasses the competitors, thereby gaining a competitive advantage in the market.
perceived value, I will turn not to discussing the other component of the TCA, the relative cost.

9.1.1.2 The Relative Cost of Market Offering

The cost of developing, producing, and delivering the total market offering is another component in the TCA that should be taken into consideration. In this regard, I had not been allowed to collect quantitative data to make a comparison among the competitors. Nevertheless, it will be concluded. Bank A is well known as having the lowest direct and indirect cost within the Egyptian banking sector, not only because of the mass production and the largest cliental base (word table 12), but also being able to attract more grants (no cost of funds) and credit lines from international bodies (with a very low cost of fund). Furthermore, there had been a reduction in the development project cost due to the strategic relationship with the germane partner (the idea owner, the EEAA), being responsible for the direction phase and its cost (as discussed in section 8.1.1). Moreover, one member of the GDT of bank A stated that:

| 4 | The product was transited to the [retail banking] division that would cost less. We would estimate that if the product was managed through our division [SMEs] it would cost us the triple. . . . Also, there is no extra capital investment made specifically for this product . . . like new IT component. . . . Also, the market research was made by our partner and we did not pay any penny. And, the development cost was nothing. (A, TM$_2$) |

In the same vein, the findings suggest that bank Z bear more costs in the acceleration phase (as shown in the steps of implementation, market campaign, training, and launch and review), e.g., when completing the development work, producing and delivering the market offering, and extending the market. It is concluded, thus, that the cost of developing, producing, and delivering the total market offering of bank Z is higher than of bank A.

9.1.1.3 The TCA

It is concluded from the previous that bank Z has generated effectiveness (differentiation) advantage, but not efficiency advantage. That is because bank Z has been able to produce superior perceived value than bank A, but at higher cost.
9.1.2 The Private Banking Product

The financial product of vehicle replacement follows the service professional and social trajectories (table 4.3), and targets a lower market segment. To get more insights regarding the marketplace position and its relationship with the financial performance in the Egyptian banking industry, I decided to analyze another innovation, following another innovation trajectory and targeting another market segment. I decided to choose the Private Banking Product (options, futures, and interest rate swaps). As shown in word table 7/25, this innovation, produced by bank D (first-mover), follows service professional and technological trajectories, and targets a higher market segment.

In 2004, the bank implemented the FLEXCUBE, being the 3rd bank in Egypt to adopt this universal CORE banking technology. In 2006, the bank established the first Private Banking Division in Egypt. After the establishment of the Private Banking Division, the small bank thought of how to create a niche market. The developers and IT experts with the cooperation of the International Holding Group were able to exploit the possibilities opened up by the Universal CORE Banking System, and developed a set of (option, future, and interest rate swap) products designed for the upper-upper segment. The bank also contracted the research expertise of the International Group to provide the RMs with a tailored International Market Outlook. The RM people also were trained to provide a valuable service characteristic: the in-depth investment advice. This resource-based product characteristic is not only critical to educate the clients with regard to such complex derivative financial instruments, but also to assist these clients when making their speculations in hope for obtaining financial gains or even for hedging purposes. Thus, this characteristic was conceived by both the bank and its clients as a core product characteristic. In return, the clients pay 25 percent of the contract value as commission.

After one year of the product launch, the local bank E joined the market, introducing a similar financial product. Since bank E did not have an international presence that would provide a relevant International Market Outlook at a relevant cost, the RM people had been using the public facilities available, like CNNMoney and REUTERS-Markets. The RM people, however, had been struggling, and were not able to produce the core product characteristic, the insightful advice. This was associated with the troubles created by the 2008 financial crises. Thus, bank E decided to introduce the product without the advice characteristic. Bank F, on the other hand, joined the market...
after two years, and decided not to introduce this characteristic. Both competitors collect around 10 percent commission.

In short, bank D has been able to introduce superior value than its competitors, by introducing a core product characteristic, \textit{satisfying unmet customer needs}. This characteristic has been highly desired and appreciated by this segment, due to the complex nature of the derivative products. In return, the bank collects higher commission. Two points here will be concluded. First, for this upper-upper market segment, \textit{value is what the client gets for what s/he pays for}. Second, bank D has been able to generate effectiveness (differentiation) advantage, but again, not efficiency advantage, being the highest in the relative cost of developing, producing, and delivering this market offering, e.g., due to the investment made in updating the dealing room to provide the instant price-execution (as shown in word table 7/25), and the cost of the International Market Outlook.

\section*{9.2 The Sustainability of Competitive Advantage}

In Chapter 5, it is theoretically argued that the TCA (effectiveness advantage, efficiency advantage, or effectiveness-efficiency advantage) established would be sustained only if it could continue to exist after efforts to duplicate that advantage would cease. In this respect, the findings suggest that the effectiveness advantage generated by both banks Z and D is sustained as none of the competitors has been able to duplicate this advantage. It is also theoretically proposed that the imitators could not be able to duplicate the advantage established if a set of imitation barriers exists. In this context, the following imitation barriers are proposed in Chapter 5: the newness and complexity of the core components of knowledge; and the ability to introduce incremental (continuous) innovation. The following is a presentation for the findings related to these two imitation barriers.

\textbf{The Newness and Complexity of Core Components of Knowledge}

In Chapter 5, it is theoretically proposed that many of the core components of knowledge underlying the operations and technologies used to produce and deliver the new product should be new and complex to be considered as a powerful impediment factor, and enable the innovator to sustain the TCA established. In this respect, the findings provide support for this argument. I will elaborate on the Private Banking
product as the knowledge underpinning the banking position in the value chain of the NPVR was not really new. In fact, it is based, to some extent, on the established auto finance product, and for this reason some banks have been able to join the protocol, and share bank A the product introduction.

Before the introduction of the Private Banking Product, the Egyptian banks were not allowed to establish mutual funds that would invest money in international exchanges, due to the negative impact on the Egyptian economy (e.g., liquidity). Thus, many of the core components of knowledge underlying this financial product were new to the Egyptian banking sector, and thus important aspects of the capability required were not possessed by many banks. Moreover, the capability required to produce this product depends on many different groups of experienced people (e.g., a group of experts responsible for providing the relevant International Market Outlook, and the well-trained RM people responsible for providing the insightful advice). Thus, it is concluded that the core components of knowledge required to introduce the product was new and complex. In this context, bank E had tried to introduce a similar product, but failed, and thus the effort of duplicating a valuable product characteristic were ceased. On the other hand, if the core components of knowledge are common and simple, it will be easy for competitors to join the market after a short period of time as shown below.

---

**It is easy for competitors to join the market when the model of the new product is easily understood and adopted. . . . For example, we were the first to introduce the product of financing the natural gas connections to home. The product model was very easy. . . . I mean by the product model the knowledge underpinning the product operations. Another competitor joined the market after several weeks to the extent that other bankers and also customers did not know which bank was really the first to introduce this product. (A, TM3)**

---

The findings also show that adding more layers of innovation protection is required. For example, if the core knowledge is specific to the (radical) innovator (new), signing a secrecy agreement with the developers and/or restrictive agreement with the supplier is critical to appropriate such valuable resource (the core component of knowledge). The product of “Day by Day Account-EGP” introduced by bank C (discussed in section 7.1.4.4: Job Rotation and Bundling Innovation), and the first Islamic credit card introduced by bank B (discussed in word table 7/28) provide support for these extra layers of innovation protection (please also see word table 6 below). Moreover, when the innovation represents a new service, singing secrecy agreement and restrictive
clauses with the key individuals involved in the introduction and delivery of this service is important, as shown in word table 7.

-It was unbelievable success, and was also hard to compete product model. . . . Why? . . . Because of the integrative [bundling] nature and the unfamiliar business model of the product; the secrecy of the financial model used. . . . we signed secrecy and restrictive agreements with the developer; and the scare programming language used . . . COBOL [emphasize added]. (C, Sen1)

-The system provider signed a restrictive agreement not to sell the new system to any competitor in Egypt for 5 years. And by the way, we paid more for this. (B, Sen3)

This is a relationship manager. He or she will build a very close relationship with our wealthy, private banking customers. So, signing secrecy agreement and other restrictive clauses are necessary in such a type of business. . . . Restrictive clauses like non-compete of staff. Also, we need to protect the investment we made in these people, and the market niche we have created. (D, Sen2)

Incremental (Continuous) Innovation

In Chapter 5, continuous innovation is another theoretically proposed barrier, enabling the radical innovator to sustain the TCA established. Continuous innovation is evident in table 8.5 (acceleration: Phase II). In this table, incremental innovation is represented by the addition of new models of vehicles and new loan tenures (6 and 7 years). (Please note that these modifications were suggested by the managing entity.) Incremental innovation is also represented by the development of the trailer vehicle replacement. Furthermore, the importance of continuous innovation is highlighted in the first part of word table (8/14). That is incremental innovation is important to cope with internal and external forces, and adapt the innovation to its environment. Coping with external forces, and adapting the innovation to its environment is best exemplified by the following quote:

You have to know that customer needs are dynamic. And, proactive competitors wait such a good catch. So, we never feel self-satisfied. . . . I mean the development effort should follow both [customer needs and proactive competitors]. . . . How do this? . . . Well, we usually undertake a formal product review each six months in the first year. After this, the new product joins the portfolio of products which is subjected to a formal review on an annual basis thereafter. If we find a good catch [a change in customer needs], we have to be nimble. . . . Crystallize the new need, develop a solution, make a quick customer survey, prepare a memo, and get it authorized. If the good catch was found by a competitor, we would need to wait for some time. . . . Not too short, not too long. (B, Sen3)
Furthermore, incremental innovation is evident in the Private Banking Product. As shown in word table 7/25, bank D “updated the dealing room to provide the instant price-execution” characteristic. According to the characteristics-based approach of innovation (Gallouj and Weinstein, 1997) discussed in Chapter 3, adding new characteristics is considered as incremental innovation.

9.3 The Superior long-term Financial Performance

Several subjective and objective measures have been used (and also suggested) to measure the superior long-term financial performance, the ultimate outcome construct of innovation success/performance. The following is a presentation for these indicators. (Please note that some of the findings with regard to the financial product of vehicle replacement should be treated with care as it is early to judge the success of a 5-7 year financial product after only two years of its launch.)

9.3.1 Sales (Market Share)

In all innovation projects investigated, the product sales were used as the first measure of the financial performance of the new product. Table 9.1 presents the market share with regard to the financial product of vehicle replacement.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Bank</th>
<th>Branches No (Phases I and II)</th>
<th>Price (%)</th>
<th>Market Share</th>
<th>Market Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Z</td>
<td>10/18</td>
<td>6.50%</td>
<td>20,640</td>
<td>59%</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>C</td>
<td>14/15</td>
<td>6.50%</td>
<td>7,360</td>
<td>21%</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>L</td>
<td>-7&lt;sup&gt;*&lt;/sup&gt;</td>
<td>6.24%</td>
<td>4,200</td>
<td>12%</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>A</td>
<td>6/8</td>
<td>6.50%</td>
<td>2,800</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source: Compiled from different sources.

* Please recall that bank L participated only in acceleration phase II.

Please recall that banks A, C, and Z participated in the acceleration phase I, and launched their products at the same time. Thus, there is no entry-market share relationship. Nevertheless, bank Z has been able to make a head start and capture a dominant market share during the first two years of the program. In the Private Banking Product, although bank D is the highest in terms of commission, it has been able to generate superior financial performance in terms of revenues, as noted below.

We have been able to capture more than half of the market share of this micro segment. . . . The targeted segment is estimated to be 700 families in Egypt. (D, Sen<sub>2</sub>)
Thus, bank D has been able to capture a respectful market share, being 100 percent in the first year (where there was no competition), and more than 50 percent in the second year, after two competitors joined the competition.

9.3.2 Growth

Growth is noticeably observed at the level of bank Z, and can be broken down into: (1) sales growth; and (2) growth by opening new window of investment. Sales growth is mainly related to the current product: the financial product of taxi replacement. The bank has an intention to participate in the following CAPs, which are expected to cover nearly 92,000 taxi vehicles. The facts that the bank has gained a respectful market share in the first two years of the program (as shown in table 9.1), conceived the program as a “valuable market opportunity” (word table 8/57), and “has been seen as the market dominator” (word table 8/58) suggest that the sales would continue to grow. Furthermore, it is expected that the sales would continue even after finishing the planned CPAs, with all of its financial incentives. The deputy of sales director stated that:

The program has been able to promote the concept of vehicle lifetime in Egypt*. . . . Now, a new taxi license cannot be issued for a vehicle older than five years. Also, the license cannot be renewed for a taxi vehicle older than twenty years. . . . Also, one market survey conducted by our people measuring the future intention for repetitive purchase has shown that many of these clients said that after repaying the loan, they would sell their vehicles, keep the taxi license, and rejoin us to buy a brand new vehicle, without the generous incentives provided by the program scheme. . . . This is a self-replacement. This is a phenomenal success. . . . Why? If you compare between the situation before and after the program, you will feel the difference. The majority of this segment did not touch the auto loan of any bank. During the launch of the first phase, the reports of our direct sales people had shown that taxi owners satisfied their financial needs in a very old fashion. Most of them joined daily associates with a group of taxi owners . . . to pay, for example, EGP 20 each day, which could account for EGP 7,200 each year. Then, this taxi owner would use this amount to renovate his vehicle and renew the taxi license. So, if we applied the regular criteria for credit, they would not be in. So, as I told you, this is a phenomenal success. (Z, Sen_2)

* This was mentioned previously in the social benefits of the NPVR (table 2.20).

The results of the future intention for repetitive purchase could also be concluded from word table 8/43 (unsatisfied with the physical evidence). Moreover, it is stated in the proposal prepared by the Kfw-Entwicklungsbank (2008) that:
The second measure of growth is mainly related to opening new window of investment through developing other variants of vehicle replacement (incremental innovation as shown in table 8.5). The manager of the new taxi unit at bank Z participated with the MOF-Fund to develop the trailer replacement product in which the closed-coupled trailers should be replaced by trucks. This aging fleet of closed-coupled trailers causes nearly 96 percent of the highway accidents in Egypt, according to a study conducted by the National Institute for Transportation for the year 2007. For this reason, Egyptians call this type of vehicles: the “Road Monsters”, or the “Monsters of Asphalt” (El-gazar, 2009, February 20). The product was ready to be launched before the Egyptian Revolution (January, 2011), but postponed due to the political and economic situations. Although this type of vehicles is completely different from the taxi vehicle (e.g., in terms of operations), the mechanism itself is considered to be another variant of the taxi replacement mechanism, though with limited financial incentive package.

9.3.3 Cross Selling

Cross selling from the new taxi owners joined bank Z is rarely observed. The major reason cited was the limited financial needs of this segment. There is, however, a belief that the business sustainability gained by the taxi owners would encourage them to buy other financial products in the future. Interestingly, the sales of some SEMs products and services (deposits and finance) of bank Z have been boosted as soon as the bank announced that it would be responsible for developing the trailer replacement product, even before the official launch of the product. One manager noted that:

We believed that we should exploit the success resulted from our participation in the national program for taxi replacement. So we made a decision to lead the trailer replacement project. However, our decision to lead this product has attracted many SMEs clients. . . . Why? Well, because the price of a truck is EGP 400,000, in average. Many of the owners of this aging fleet of trailers will not be able to pay such high amount in cash. So, they will need our credit facility. But, such type of credit facilities requires in-depth credit study. This may take few months for new clients, and very few weeks for the current clients. So, they joined us early to save time. (Z, Mid1)

Cross-selling has also been noticeably observed with regard to the Private Banking product. A high number of the new clients purchased the successful derivative financial
instruments from bank D have purchased several types of (corporate, SMEs, and consumer) finance and investment products and services. One manager noted that:

| Highly successful products create market sounds and increase the brand awareness which has a positive impact on the sales of the current portfolio of products. (D, Sen₁) |

9.3.4 Corporate Social Responsibility (Corporate Reputation)

Corporate social responsibility is identified as subjective success measure by both banks Z and A. For example, many new clients who are interested in the concept of green environment have joined bank Z. The major reason cited by these clients was corporate social responsibility, being a member in the national program for vehicle replacement as noted below.

| After privatization, one of our vision statements is to be and be perceived as local and international best practice for social and environmental responsibility. The first opportunity to actualize this statement was through the participation in the national program for taxi replacement. . . . Our bank has gained a significant favorable publicity due to being a key player in the first two phases of the program, and also the propaganda associated with the story in the media. The Egyptians also actualized this. . . . Some new SMEs customers and many new retail customers have actualized this by joining us. (Z, Sen₁) |

9.3.5 Building the Innovation Routine (Learning Effects)

This subjective measure was repeatedly cited by the GDT of bank A. After the success of the pilot project (the incubation phase), the team had submitted two proposals for new organizational ideas: the idea bank; and the establishment of a separate department for innovation. Only the latter idea was approved by the TMT. Two major reasons are cited, justifying the establishment of this new department. These are: gaining more confidence after engaging in several success stories (as discussed in Section 7.1.1.1); and the desire to conserve the organically built innovation capability, especially after the loss of champion who had provided all the support and protection (capability patron). The following notes were made by the GDT of bank A:

| -The team has consolidated the innovation thinking by creating several outputs in several ways. Thus, you can create a thing from nothing. You can create a concept, and deal with it. You can make a difference to your organization. This is the most valuable organizational asset that is usually unlisted in the balance sheet. . . . It is the reputation for innovation. (A, TM₃) |

| -After engaging in several successful development projects, we felt that it was important to conserve this capability and to establish the development unit. That is because the development capability had been built organically, and with time. With time. (A, TM₃) |
9.3.6 Building and Enhancing Strategic Relationships

One major characteristic of this type of radical innovation (NPVR) is the creation of a new business model (new value chain). This is also evident in the Private Banking Product in which bank D built a new business model when contracting the research facility of the International Group to provide the RMs with the tailored International Market Outlook. Thus, building new relationships and enhancing the current relationships with national and international bodies are considered as another subjective success measure. This measure was identified by the developers at both banks A and Z.

Being a partner of the most powerful governmental body in Egypt [the Ministry of Finance] is an advantage in itself. (Z, Mid1)

A major advantage for such type of national projects is that it enables you to strengthen the relationships with national and international bodies . . . national bodies like the Ministry of Finance, and international bodies like the Kfw and the World Bank. (A, Mid1)

9.3.7 Profitability

Profitability is the most critical measure in the ultimate outcome variable. But, the profitability of radical innovations is the most intricate success measure for two reasons. First, it is difficult to conclude the superior performer in terms of profitability, taking into consideration that each bank has its own price (e.g., interest rate, commission, fees), its own direct and indirect cost, and it is own estimation for risk (and thus provision percentage). (Please note that I was not allowed to collect sufficient quantitative data to be able to compare among all competitors in each competitive situation, and conclude the one with the highest profitability.) Second, it is important to take into consideration some of the previous measures of long-term performance (e.g., opening new window of investment; and corporate social responsibility), as these measures have indirect financial implications. Even building and enhancing strategic relationships may contribute to the bank profitability. The manager of the GDT stated that:

The bank could obtain more grants and low cost loans from international bodies . . . like the World Bank, the Kfw, and the European Union, and as such, develop more credit lines in the same track . . . environmentally friendly financial products. (A, Mid1)
Therefore, three sub-measures of profitability have been used (by banks Z and D): *product profitability; segment profitability;* and *total profitability.* The second measure is used to take into consideration the cross-selling. The third measure is used to take into consideration the indirect impact of subjective measures on bank profitability. Estimating these sub-measures of profitability is facilitated by the advanced IT application (Universal CORE banking). One manager at bank D noted that:

| The Universal CORE Banking technology enables you to estimate the profitability of everything . . . the profitability of one customer, the profitability of one transaction, the profitability of one segment. (D, Sen,2) |

9.4 Discussion

In this section, I will discuss the findings related to: temporary competitive advantage (TCA); sustainable competitive advantage (SCA); superior long-term financial performance; and imitation barriers.

9.4.1 Temporary Competitive Advantage (TCA)

The findings show that banks Z and D have been able to generate only *effectiveness (differentiation) advantage* by delivering superior customer perceived value in terms of: (1) installations; (2) professionalism; (3) quality; (4) functional value price; (5) emotional value; (6) social value; and (7) satisfying unmet customer needs. Past research provides support for this finding. In short, the finding suggests that the customer perceived value needs to be captured by a theoretical (second-order) construct, manifested by 7 first-order latent factors.

This is consistent with the conceptualization of customer perceived value suggested in Chapter 5. I show that Roig *et al.* (2006) operationalize customer perceived value as a theoretical construct manifested by six lower-order latent factors. These are: (1) functional value of the establishment, installations (e.g., the servicescape is spacious and modern, it is easy to find and accessible); (2) functional value contact personnel, professionalism (e.g., the personnel know their job well, and the personnel’s knowledge is up to date); (3) functional value of the service purchased, quality (e.g., the service as a whole is correct, the quality compared with competitors is acceptable); (4) functional value price (e.g., the services is good for the expense it causes me); (5) emotional value (e.g., I feel relaxed, and I feel at easy); and (6) social value (e.g., the fact that I come
here looks good to the people I know). Moreover, in Chapter 5, I suggest that the previous theoretical (second-order) construct would need to be adapted to reflect the customer perceived value resulting from the innovation activities. In this respect, I suggest adding the first-order latent factor developed by McGrath and Ming-Hone (1996), satisfying unmet customer needs, as a the seventh first-order latent factor underlying the construct developed by Roig et al. (2006).

The dynamic theories of competition discussed in Chapters 4 and 5 show that TCA has three levels: effectiveness advantage; efficiency advantage; or effectiveness-efficiency advantage (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999). However, the two competitive situations examined provide support only for the first level (effectiveness advantage). Despite the lack of empirical evidence, I have decided to include the second level (efficiency advantage), and to remove the third level (effectiveness-efficiency advantage). It is possible for a radical innovator to generate efficiency advantage. As found by several scholars (McDermott and O'Connor, 2002; O'Connor and DeMartino, 2006; O'Connor, et al., 2002), some radical innovations result in a significant reduction in cost, 30-50% or greater. However, contrarily to the dynamic theories of competition, it is not expected for a radical innovator to generate both effectiveness-efficiency advantages. As argued by Porter (1985: 16-17), firms needs “to make a choice about how to compete. . . . because achieving different types of competitive advantage usually requires inconsistent actions”. In this respect, he argues that firms seeking both advantages may “stuck in the middle”, neither be able to sustain the effectiveness advantage, nor be able to sustain the efficiency advantage.

9.4.2 Sustainable Competitive Advantage (SCA)

The findings show that the TCA generated by both banks Z and D continues to persist. That is competitors have failed to duplicate this competitive advantage, and that their efforts to duplicate this advantage have ceased. Past research (Barney, 1991, 2007; Barney and Clark, 2007; Bharadwaj, et al., 1993; Dierickx and Cool, 1989a; Hunt, 2000a) provides support for this finding, in that it is possible for firms generating TCA to sustain this advantage. Though, a set of imitation barriers must exist (discussed later).
9.4.3 Superior Long-Term Financial Performance

The findings suggest that this construct should consider 7 subjective and objective measures: (1) sales; (2) growth (growth in sales, and growth by opening new window of investment); (3) cross selling; (4) corporate socially responsibility (corporate reputation); (5) building the innovation routine (learning effects); (6) building and enhancing strategic relationships; (7) profitability (product profitability, segment profitability, and total profitability). Measures 1-5 and 7 are in line with past research (Blazevic and Lievens, 2004; Brown and Eisenhardt, 1995; Cooper, et al., 1994; Cooper and Kleinschmidt, 2007; Dibrell, et al., 2008; Griffin and Page, 1996; Li and Calantone, 1998; Lievens and Moenaert, 2000; McGrath and Ming-Hone, 1996; Menor and Roth, 2008; Moreno and Casillas, 2008; Salomo, et al., 2007; Wiklund and Shepherd, 2003). The sixth measure, however, is grounded in the case study findings. Thus, the current research suggests adding this subjective measure to the measurement of this construct.

9.4.4 Imitation Barriers

The findings suggest that two constructs are essential and represent powerful impediments to protect the CA from being duplicated by competitors. These are: (1) many of the core components of knowledge underlying the operations and technologies used to produce and deliver the new product/service should be new and complex; and (2) the radical innovator should be able to introduce incremental (continuous) innovation. Past research (Garcia and Calantone, 2002; MacMillan, et al., 1985; Zander and Kogut, 1995) provide support for these two constructs. However, after accumulating sufficient, firsthand knowledge regarding the innovation and imitation behaviors in the banking industry, I will incorporate more advanced theories so as to enhance the conceptualization of the imitation barriers. In other words, the imitation barriers will be enhanced by incorporating more powerful theories suggested within the competence-based view of the firm. The main motivation behind this re-conceptualization was that I found two main types of imitators. The former type copies new products as soon as they are introduced by competitors. Bank H is a case in point (please recall word table 7/13 and 7/16). The latter type waits for some time to be able to introduce better product. Bank B is a case in point (please recall word table 8).

This is consistent with the literature of innovation, strategic management, and marketing, which recognizes two types of competitors that have different strategic
postures in terms of innovation, risk-taking, and entry orders, and, therefore, the resource base accumulated. These are: “early followers”, like bank H; and “late entrants”, like bank B. The former type may be able to react swiftly by imitating the first-mover product and launching “me-too/copy-cat” product. Though, as the radically new product lacks “history”, and disrupts the established practices, there is a high degree of uncertainty surrounding the imitation decision. Nevertheless, these imitators try to make expectations regarding the likely outcomes of the imitation decision. Based on these expectations, they may take a decision to imitate “too closely”. Though, this leaves “little room for differentiation. This may be one of the reasons why financial institutions have found it difficult to retain customers recently”. The latter also employs a reactive yet sophisticated strategy of “wait-and-see” to introduce a “second-but-better” product (Harrison, 2000: 764; Kerin, et al., 1992; Lee et al., 2003; Morris and Westbrook, 1996). This highlighted the importance of enhancing the imitation barriers to be complete and detailed. More specifically, the late entrant problem is the concern of this re-conceptualization of the imitation barriers, as this type of competitors, as the findings suggest, could represent real challenge to the first-mover. In this regard, three broad imitation barriers will be suggested. These are: managing through the life cycle; complexity; and nontradeability.

9.4.4.1 Managing through the Life Cycle
The pioneers of radically new products need to know how to manage the product after the effective full-scale introduction. But, the concept of managing through the life cycle is wide, and includes many variables that are beyond the scope of the current research (Harrison, 2000; Urban and Hauser, 1993: 558). There are, however, two critical dimensions will be taken into consideration. These are: incremental (continuous) innovation; and managing the asset erosion. These two dimensions are consistent with the organizational learning literature (e.g., March, 1991), and the “dynamic capability” (Teece, et al., 1997). They also provide a solution for the “core rigidities” identified by Leonard-Barton (1992).

Incremental (Continuous) Innovations
Incremental innovation is actually discussed in section 9.2. The findings show that “customer needs are dynamic” and “proactive competitors [late entrants] wait such a good catch” to introduce second-but-better product (word table 8). Thus, the ability to introduce incremental innovations will enable radical innovators to sustain the CA
established. In the same vein, Gallouj (2002) argues that incremental innovation is critical to create variety, extend the dominant design, and enhance the fitness (degree of adaptation or suitability) of the radical innovation to its environment (please also recall figure 3.4).

Managing the Asset Erosion

“All asset stocks ‘decay’ in the absence of adequate maintenance expenditures”. Brand awareness erodes because the population of consumers is not “stationary”, and consumers forget. The effective stock of R&D know-how depreciates annually due to technological obsolescence. The effective stock of technical knowledge also depreciates due to the innovation introduced by rivals. As the effective stocks of these assets depreciate annually, they may be augmented by other factors like advertising, R&D spending, and training. In other words, the better maintenance of asset stock over time will be, the slower the decay of asset stock over time will occur (Dierickx and Cool, 1989a: 1508). (Please note that prior studies in the R&D productivity literature have used erosion rates “near 15%” (Knott, et al., 2003: 205). Therefore, the current R&D stock of knowledge is the net addition (flows minus depreciation) to the pre-existing stock (Grilliches, 1979).) In short, the effective management of asset erosion will enable radical innovators to sustain the CA established.

9.4.4.2 Complexity

Regarding the Private Banking Product, I provided evidence that the complexity of the core knowledge represented an effective imitation barrier. In other words, if the operations, sciences, and technologies underlying the vector (T) are highly varied, and reside in different stages of a vertical chain (e.g., operations and marketing; or back- and front-office operations) the capability network is said to be complex, and the capability-based advantage continues to persist (Bharadwaj, et al., 1993; Helfat and Raubitschek, 2000; King and Zeithaml, 2001; Lippman and Rumelt, 1982; MacMillan, et al., 1985; Reed and DeFillippi, 1990). In this respect, the work of Rivkin (2000: 825) provides “the first formal analysis of complexity as a barrier to imitation”. He examines the process of imitation by showing how tight coupling among elements of strategy protects a successful firm from imitation. He concludes that, when “all other barriers to imitation are absent”, the complexity of strategy alone is a powerful barrier to imitation. Though, this strategic complexity amplifies other barriers, like resource barriers, and vice versa. In this respect, past research has shown that the complexity of capability is
argued to be a powerful barrier for resource imitation because complexity generates both: causal (linkage) ambiguity; and uncertain imitability. The following is a presentation for each impediment factor.

**Causal (Linkage) Ambiguity**

Lippman and Rumelt (1982) define causal ambiguity as a phenomenon surrounding the causal connection between actions (antecedents) and results (superior performance) in large firms. In other words, the complexity of capability network generates ambiguity, which makes it difficult for the would-be imitators to establish cause-effect-relationship, when identifying the antecedents of CA.

**Uncertain Imitability**

Lippman and Rumelt (1982: 418) also define uncertain imitability as “a dispersion in the results [performance] obtained by different firms even when initial endowments are equivalent”. In other words, even if the would-be imitators are able to decompose the capability network by engaging in a careful systematic study of the radical innovator to reduce their knowledge disadvantage, and if many of the ingredients of the operations and associated technologies mobilized to produce the final characteristics are tradeable (e.g., the codified components of knowledge), the would-be imitators may not be able to produce the same result.

**9.4.4.3 Nontradeability**

Even if the capability network can be decomposed and understood, the would-be imitators still need to acquire the strategic asset stocks required to duplicate the radical innovator’s marketplace position. If these strategic resources are new and nontradeable (firm-specific), and also appropriated by the innovator (e.g., through layers of innovation protection as found in the case study: signing secrecy agreements and restrictive clauses with the developers, suppliers, and key individuals) the would-be imitators are constrained to accumulating these strategic asset stocks. In this respect, the strategic management literature asserts that nontradeability (specificity) is a powerful impediment for imitation if the accumulation process is characterized by one or two attributes discussed in section 4.1.1.1: time compression diseconomies; and interconnectedness of asset stocks (Dierickx and Cool, 1989a). The following is a discussion for each mechanism.
Time Compression Diseconomies
As discussed in section 4.1.1.1, the process of asset stock accumulation “cannot be rushed”. Therefore, imitators who increase other resources to reduce the time needed to accumulate a similar asset stock will not achieve the same resource position. It is the “scale economies” that the radical innovator enjoys due to the first-mover resource position. An example is the “blitz” advertising campaigns implemented by imitators which tend to be less productive and effective than similar expenditures made over a longer period. A second example is the reputation for quality that the radical innovator builds by following a consistent set of production, quality control, and other policies over time. For the same reason, imitators may not be able to match the reputation with partners and suppliers involved in the newly created business model (Bharadwaj, et al., 1993; Dierickx and Cool, 1989a; Grant, 2002; Knott, et al., 2003: 192-193).

Interconnectedness of Asset Stocks
As discussed in section 4.1.1.1, this attribute indicates that the pace of an asset stock's accumulation may be influenced by the level of other (complementary) asset stocks. This implies that a lack of complementary resources can often impede imitators from accumulating a desired asset stock needed to successfully imitate the radical innovation (Dierickx and Cool, 1989a). For example, followers need to build not only the core knowledge, satisfying their position in the value chain, but also the integrative knowledge, linking them to the partners and suppliers in the newly created business model. Thus, even a newcomer may be able to develop more efficient operations to produce the final characteristics, the lack of this complementary resource may place this newcomer at a competitive disadvantage (Bharadwaj, et al., 1993). In this context, it is expected that the more the complexity of the core knowledge underpinning the operations, sciences, and technologies will be, the greater the effect of the interconnectedness of asset stocks will be.

9.5 The Performance Measurement
Based on the previous findings and discussions, the success/performance of radical service innovation will be conceptualized as shown in figure 9.1.
Two notes need to be made regarding the previous figure. First, the propositions linking these constructs will be developed in Chapter 10. Second, effectiveness advantage is generated when the radical innovators is able to deliver superior customer perceived value, which is conceptualized as a theoretical (second-order) construct manifested by 7 first-order latent factors, as shown in figure 9.2.
9.6 Summary

This chapter has presented the findings, discussions, and conceptualization of the success/performance measurement of radical innovation in the service context (Layer III of the conceptual framework). I have examined two different competitive situations: the first is related to the financial product of vehicle replacement, which follows service professional and social trajectories; and the second is related to private banking products, which follow service professional and technological trajectories. The findings suggest that radical innovators may generate temporary competitive advantage (TCA), which may be either effectiveness (differentiation) advantage, or efficiency advantage. Moreover, this CA could be sustained if a set of imitation barriers exists. These barriers are: managing through the life cycle (incremental innovation, and managing the asset erosion); complexity (causal ambiguity, and uncertain imitability); and nontradeability (time compression diseconomies, and interconnectedness of asset stocks). Furthermore, superior long-term financial performance is found to be captured by 7 subjective and objectives measures.

In Chapter 10, the research propositions linking all the constructs concluded in Chapters 7 (LI), 8 (LII), and 9 (LIII) will be developed.
Chapter 10 The Development of Research Propositions

The aim of this chapter is to develop the research positions linking all the constructs concluded in Chapters 7 (LI), 8 (LII), and 9 (LIII). This chapter is organized in three sections. Section one summarizes all the constructs concluded in Chapters 7-9. Section two develops and discusses the research propositions linking these constructs. Section three provides a summary for the chapter.

10.1 The Theoretical Constructs Concluded

Based on the findings and discussions presented in Chapters 7-9, I concluded a set of constructs. Table 10.1 lists all the constructs concluded in these chapters.
### Table 10.1: The Theoretical Constructs of the Multi-layer Conceptual Framework

<table>
<thead>
<tr>
<th>Layer</th>
<th>Theoretical (Third-order) Constructs</th>
<th>Theoretical (Second-order) Dimensions/Constructs</th>
<th>First-order Latent Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI: CH 7</td>
<td>Entrepreneurial (Resource Building) Capability</td>
<td>-Executives as Capability Patrons; -Executives as Shapers of Culture; and -Executives as Engineers (Architectures).</td>
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<td></td>
<td>Core Radical Innovation Competence (Core RIC), a superordinate construct manifested by five theoretical (second-order) dimensions</td>
<td>R&amp;D Capability</td>
<td>-Team Capability (Generalist Development Team, and Cross-Functional Team); -Proactive Research Capability; -Network of Contributors; and -Potential Absorptive Capacity.</td>
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<td></td>
<td>IT Capability</td>
<td>-Hardware and Infrastructure; -Universal CORE banking &amp; Other Enabling Software; and -IT Experience.</td>
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<td></td>
<td>Cooperative (Networking) Capability</td>
<td>-Filling the Competence Gap; -Building a High Level of Trust; -Sustaining Growth; -Enhancing Mutual Adaptability; -Creating the Innovation Routine (Coordination); -Easing Crisis; -Developing Effective Communications; -Reducing Uncertainty; and -Reducing Cost.</td>
<td></td>
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<td></td>
<td>Managerial Systems</td>
<td>-Effective Mechanism for Internal Selection; -Effective Training Mechanism; -Entrepreneurial Retention (Rewards and Promotions); and -Job Rotation.</td>
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<td></td>
<td>Innovation-friendly Culture</td>
<td>-Sharing Knowledge; -Providing Support; -Taking Risk; and -Accepting Change.</td>
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<tr>
<td>LII: CH 8</td>
<td>Project Management Capabilities (Incubation Capability)</td>
<td>Assigning New Venture Champion</td>
<td>-Champion as Incubator; and -Champion as Integrator.</td>
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<td></td>
<td></td>
<td>Establishing Entrepreneurial Frame</td>
<td>-Setting Clear Strategic Objectives; and -Flexibility of Means.</td>
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<td></td>
<td></td>
<td>Formulation and Preliminary Design</td>
<td>-Studying Similar International Experiences; -Creating a Clear and Comprehensive Concept;</td>
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<td>Chapter 10 The Development of Research Propositions</td>
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<tr>
<td><strong>Effective Evaluation</strong></td>
<td>-Designing Preliminary Processes and Integrating them into a Clear Workflow.</td>
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<tr>
<td><strong>Rapid Prototyping and Live Experimenting</strong></td>
<td>-Developing Quick (Crude) Prototype; -Close and Continuous Monitoring (when going live to experiment); -Flexibility; -Open Communication among Partners; -Synthesizing the Step-functional Learning Accumulated.</td>
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<tr>
<td><strong>Building and Finalizing the Business Model</strong></td>
<td>-Understanding and Experimenting with the Entire Value Chain; -Identifying the Weaknesses and Threats of the Acceleration Phase; and -Designing Strict Partnership Agreements.</td>
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<tr>
<td><strong>Project Management Capabilities (Acceleration Capability) Managing the Transition to Operations</strong></td>
<td>-Assembling a Transition Team; -Assigning (Push and Pull) Transition Champions; and -Assessing the Transition and Integration Readiness.</td>
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<tr>
<td><strong>Implementation</strong></td>
<td>-Physical Implementation; -Well-designed Media Campaign; and -Personnel Training, Evaluations, and Compensation.</td>
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<tr>
<td><strong>Introduction</strong></td>
<td>-Fast Adaptive Control System; and -Capability Replication.</td>
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<td><strong>Construct First-order latent factors</strong></td>
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<tr>
<td><strong>LIII: CH 9 Success/Performance Measurement of Radical Service Innovation</strong></td>
<td><strong>Temporary Competitive Advantage (TCA):</strong> -Effectiveness (Differentiation) Advantage (Superior Customer Perceived Value but with Party Cost); or -Efficiency (Cost) Advantage (Party Customer Perceived Value but with Lower Cost). <strong>The Customer Perceived Value (measured by the following 7 first-order latent factors):</strong> -Functional value of the establishment, installations; -Functional value contact personnell, professionalism; -Functional value of the service purchased, quality; -Functional value price; -Emotional value; -Social value; and -Satisfying unmet customer needs. <strong>The Cost of Developing, Producing, and Delivering the Total Market Offering</strong></td>
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<tr>
<td><strong>Sustainable Competitive Advantage (SCA)</strong></td>
<td><strong>-Sustainable Effectiveness (Differentiation) Advantage; or -Sustainable Efficiency (Cost) Advantage.</strong></td>
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<tr>
<td><strong>Imitation Barriers, Moderating the TCA-SCA Relationship</strong></td>
<td><strong>Managing through the Life Cycle:</strong> -Continuous Innovation; and</td>
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Chapter 10 The Development of Research Propositions

<table>
<thead>
<tr>
<th>Complexity:</th>
<th>Nontradeability:</th>
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<tbody>
<tr>
<td>-Managing the Asset Erosion.</td>
<td>-Time Compression Diseconomies; and/or</td>
</tr>
<tr>
<td>Complexity:</td>
<td>-Interconnectedness of Asset Stocks.</td>
</tr>
<tr>
<td>-Causal Ambiguity, and</td>
<td></td>
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<tr>
<td>-Uncertain Imitability.</td>
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<tr>
<td>Superior Long-term Financial</td>
<td>Superior Long-term Financial Performance</td>
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<tr>
<td>Performance</td>
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<tr>
<td>-Sales (Market Share);</td>
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<td>-Growth;</td>
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<td>-Cross-selling;</td>
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<td>-Corporate Social Responsibility</td>
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<td>(Corporate Reputation);</td>
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<td>-Building the Innovation Routine</td>
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<td>(Learning Effects);</td>
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<td>-Building &amp; Enhancing Strategic</td>
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<td>Relationships;</td>
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<td>and</td>
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<tr>
<td>-Profitability (Product, Segment,</td>
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<td>and Total).</td>
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</tbody>
</table>

Source: As shown in figures 7.7 (Entrepreneurial Capability); 7.6 (Core RIC); 8.7 (Incubation Capability); 8.11 (Acceleration Capability); and 9.1 (Success/Performance Measurement); and 9.2 (Customer Perceived Value).
10.2 The Development of Research Propositions

Figure 10.1 represents an abstract form of the multi-layer conceptual framework, linking all the higher-order concepts together. The research propositions, shown in figure 10.1, will be presented and discussed in the following.

10.2.1 Linking Entrepreneurial Capability to Core RIC (P₁)

In the current research project, the entrepreneurial (resource building) capability is conceptualized as a theoretical (second-order) construct manifested by three first-order latent factors: executives as capability patrons; executives as shapers of culture; and executives as architects (engineers). On the other hand, Core RIC is conceptualized as a
superordinate theoretical (third-order) construct manifested by five theoretical (second-order) constructs: R&D capability; IT capability; cooperative (networking) capability; managerial systems; and innovation-friendly culture. Moreover, each of these five constructs is manifested by a set of first-order latent factors.

Capability patrons are essential to build the capabilities underlying the Core RIC. In the case of bank A, the findings show that the corporate credit executive (board member) and R&D senior manager had been responsible for building and protecting the R&D capability of the bank, especially the team capability and potential absorptive capacity. In the case of bank E, the corporate executive for procedures development had been responsible for building a network of contributors, another factor of R&D capability. In the case of bank C, the bank had lacked all the factors underlying the IT capability due to the lack of capability patrons as the old board of directors had been risk-averse, and lacking the willingness to cannibalize. However, as soon as a new board of directors has been hired, the bank has started to accumulate all the factors underlying the IT capability. Shapers of culture are also found to be essential factor within the resource building capability. The culture of several banks had been described as conservative, and did not promote knowledge sharing, mutual support, and risk taking. Moreover, there was a high degree of resistance to change. In this respect, corporate executives and senior managers have been found to design and implement several soft and hard tools intended to shape these cultures to be more innovation friendly. The case study findings also suggest that executives should also play the role of engineers (architects), who have the ability to not only build organizational capabilities, but also configure and bundle these capabilities to produce a synergetic result. As shown in table 10.1, Core RIC is a very complex resource, due to the complementarity found among the five capabilities, and the high number of first-order factors underlying these five capabilities (24 first-order latent factors). Core RIC is also a dynamic resource as these five capabilities are asset stocks that require a longer term approach to be accumulated through a consistent pattern of asset flows. The findings show that the lack of this resource building factor has caused inconsistency in the accumulation process (e.g., accumulating one capability while ignoring its complement).

These findings are consistent with past empirical and conceptual research. For example, Davies and Brady (2000) find that building core competences requires a top-down approach, in which strategic managers identify, build, and sustain core competences that
Chapter 10 The Development of Research Propositions

will enable the firm to adapt to and shape its environment. Moreno and Casillas (2008) suggests that entrepreneurial executives should have the ambition to grow organically, and that this ambition is essential to design and implement strategies that will enable the firm to: develop new products and technologies; and/or expand through paying attention to new needs and markets. Salunke, et al. (2011) find that service entrepreneurship is essential to build a set of capabilities that will drive service innovation. Lado et al. (1992), Verona (1999), and Herrmann et al. (2006) argue that strategic managers are the causal actors how are responsible for building all the innovation related capabilities, including: R&D capability; managerial systems; and innovation culture. The previous findings and discussions provide support for the proposition that the lack of any factor of the entrepreneurial (resource building) capability construct would prevent the accumulation of Core RIC. This provides support for the following proposition:

\[ P_1: \text{The existence of the entrepreneurial (resource building) capability is necessary to accumulate the Core RIC.} \]

10.2.2 Linking Core RIC to Project Management Capabilities (\(P_{2A}-P_{2B}\))

While Core RIC is essential, it is not sufficient. The findings show that radical service innovation in the banking context is developed through two distinct phases, each requires distinctive capability. These are: incubation capability; and acceleration capability. However, the chronological documentation of the case studies suggests that the Core RIC is essential to build these two project management capabilities. For example, Bank A had been chosen to lead the incubation phase of the NPVR because this bank had developed the relevant R&D capability before the initiation of this phase. The team capability and potential absorptive capacity, two dimensions underlying the R&D capability construct, are cases in point. The GDT of bank A had been a key actor in the incubation phase, leading the early steps of this phase. Moreover, the bank had participated in a set of environmentally related (CDM) projects before participating in this phase. This had embedded the R&D capability of bank A with the potential absorptive capacity, essential to serve the future radical innovation (the NPVR). On the other hand, the findings of the radical innovation project examined show that this radical innovation had been developed within a network of cooperating partners. For example, one partner had undertaken all the activities of the direction phase, a second
partner had provided a market (customer data base) to experiment, and a third partner had played key role in designing the CDM-transport methodology and building and finalizing the business model. In this respect, the findings show that bank A had developed the cooperative (networking) capability, through establishing strategic relationships with these partners. This was another reason for why bank A had been chosen to lead the incubation phase of the radical. In short, the previous findings suggest that the R&D capability and cooperative (networking) capability are essential to build the incubation capability. (It should be noted, however, that bank A had spent more than five years to build these two capabilities. That is because these two capabilities had been accumulated through learning and experience.)

The findings also suggest that other capabilities and dimensions within the Core RIC are essential to be able to build the incubation capability. For example, exploratory marketing research are found to be very valuable, and based on which service developers have been able to develop a three-year Product Map with a vision, mission, and strategic planning. Moreover, banks built superior IT capability have been able to introduce technological innovations. Advanced IT systems (Universal CORE banking technology) are embedded with numerous features that can provide service developers and IT experts with new product characteristics. Thus, ideas for new product characteristics may be approached not only from the business wise, but also from the IT wise. Moreover, IT, as an enabler, facilitates the inter- and intra-organizational communications during this phase. The findings also show that a culture that promote knowledge sharing, providing support, taking risk, and accepting change is essential. The findings show that a battle each time is initiated when a totally new concept is created, and the product owners seek the feedback from the relevant actors inside the bank. Several actors and functions (e.g., legal people, audit people, risk people, and branch managers) are found to reject the adoption of the previous four values and norms. Moreover, the incubation phase is associated with a high degree of technological and market uncertainties that require accumulating experimental learning. In the respect, fair rewards and promising promotion should be designed to encourage the entrepreneurial (incubation) development team to take risk and accumulate this learning.

The findings also show that Core RIC is essential to undertake not only the incubation activities, but also the acceleration activities. For example, assembling a transition team (including members from the GDT, members form the receiving unit, and a transition
expert) is found to be an essential step intended to assess the transition and integration readiness and compete the development work. In this respect, the chronological documentation of the case study show that the cross-functional (cross-divisional) team capability had been developed before the initiation of the acceleration phase through the participation in several previous transitions. Moreover, the findings suggest that a culture that promote risk taking and that is low in resistance to change facilitates the transition to operations. Thus, it is concluded that if the members of the receiving unit do not take risk and accept the change associated with innovation implementation and adoption, the tool of transition (push and pull) champions would be less effective, and the transition process would linger. Managerial systems also play a key role when designing and implementing the training programs required to train all the people involved in the production, delivering, and selling of the new product. IT capability also plays a critical role in this phase. Besides being an integral part of the production and delivery of the new product, translating those parts of the operations that will be handled through technological medium may involve experimental development that require IT prototype facility and the participation of IT experts. Furthermore, Universal CORE Banking technology is a customer centric rather than an account or business centric. Thus, it plays a critical role in identifying the selling and cross-selling opportunities. This has an important implication for the plan of market development prepared in the acceleration phase.

In short, the previous findings show that the dimensions and/or first-order factors underlying the Core RIC are critical to successfully undertake the incubation and acceleration activities, and thus accumulate the incubation and acceleration capabilities. These findings are consistent with past research. For example, Cohen and Levinthal (1990), and Zahra and Nielsen (2002) suggests that accumulating potential absorptive capacity before engaging in radical innovations is essential. Davies and Brady (2000) find that building a potential absorptive capacity, starting the bottom-up learning process, is essential to build and expand core operational capabilities to compete in new areas of business. Pennings and Harianto (1992) argue that the radical innovating entity should develop an initial level of absorptive capacity which diminishes the “threshold for extracting know-how” from its partners during the radical innovation initiative.

Moreover, several scholars (e.g., Barras, 1986, 1990; Drew, 1995; Froehle, et al., 2000; Morris and Westbrook, 1996; Nambisan, 2002; Nonaka, 2007; Nonaka, et al., 2001;
Pennings and Harianto, 1992; Tippins and Sohi, 2003; Windrum and García-Goñi, 2008) demonstrate that (service) firms cannot introduce and/or adopt (radical) technological innovation without accumulating technological capability, e.g., a fund of knowledge and a stock of applications, software, and databases. Moreover, the majority of service (innovation) research (e.g., de Vries, 2006; Herrmann, et al., 2006; Ordanini and Parasuraman, 2011; Ritter and Gemünden, 2004; Sivadas and Dwyer, 2000; Story, et al., 2011; Whitley, 2000; Windrum and García-Goñi, 2008) suggest that radical innovations are developed and introduced within a network of cooperative partners, and thus building cooperative (networking) is essential before the initiation of radical innovations. As stated by Story, et al. (2011), the would-be radical innovators need to establish strategic relationships with germane suppliers and partners before the initiation of radical innovations because this networking capability cannot be built during the RI development due to the complex, dynamic, and uncertain environment of the development process. Other studies also provide support to the findings that the building culture and managerial systems that support and enhance the innovation activities (e.g., creativity, innovativeness, risk taking, experimentation) are essential (Atuahene-Gima, 1996; de Brentani, 2001; den Hertog, et al., 2010; Lengnick-Hall, 1992; Leonard-Barton, 1992; Lyons, et al., 2007; Moorman, 1995; Sethi, et al., 2001; Smith, et al., 2005; Souitaris, 2002; Stringer, 2000; Verona, 1999).

All in all, the previous findings and discussions show that the accumulation of the five capabilities and strategic resources underlying the Core RIC, which are conceived as complementary asset stocks that cannot be adjusted instantaneously, is critical for undertaking the radical innovation project (incubation and acceleration) activities, and thus building the incubation and acceleration capabilities. In other words, building the Core RIC is expected to make the course of these innovation projects shorter, less circuitous, less expensive, and more certain. Based on the previous, it is proposed that:

\[ P_2: \text{The existence of Core RIC is necessary for building the incubation capability (P}_{2A} \); and the acceleration capability (P}_{2B}. \]

### 10.2.3 Linking Project Management Capabilities (P3)

The findings of the radical innovation project investigated, the NPVR, suggest that the development and implementation of radical service innovation have an *evolutionary*
nature, in which cumulative learning (gradualism) plays an essential role. Table 8.5 discusses the nature of radical innovation management in terms of characteristics dynamics. This table shows that the incubation phase starts by a raw (very basic) idea. The incubation activities have sought to: create a comprehensive concept; design preliminary internal process of each actor in the network and integrate these processes into a clear workflow; develop quick/early prototype and go live to accumulate experimental learning. This table also shows that the main outcome of the incubation phase is to build and finalize the business model (value chain) that: (1) addresses the problems and issues identified in the incubation phase and suggests solutions for these issues and problems; (2) addresses the weaknesses and threats of the acceleration phase, suggests clear recommendations, hires new actors to fill positions within this value chain, and design partnership agreement with these actors.

In this respect, the findings show that all the solutions generated, recommendations made, and agreements designed have had critical implications for the performance of the acceleration phase. For example, all the solutions generated and recommendations made during the incubation phase and implemented during the acceleration phase have greatly enhanced the performance of the acceleration phase. On the other hand, ignoring some solutions and recommendations during the acceleration phase has had a negative impact on the performance of the acceleration phase. In a similar vein, the quality of new actors hired to fill positions within the value chain and the partnership agreement designed with these actors have had an impact on the performance of the acceleration phase. The ad crisis, the massive expansion of the program, the limited capacity of the storage site, and the lack of customer trust are cases in points. Ignoring the recommendations related to the previous has caused struggles to all participants in the value chain, including banks which are a node in the larger network. Moreover, it is expected that if many technical and market uncertainties are not attacked by the development team during the incubation phase, or if learning disabilities exist, the receiving unit would face much difficulty in completing the development work and the subsequent activities. In general, if the project does not approach maturity by the end of the incubation phase, and technical and market uncertainties are not reduced, the receiving unit would lack the: confidence to consolidate the innovation; desirability to catch the opportunity; and ability to reduce the new uncertainties specific to the acceleration phase.
The attribute of asset mass efficiencies (Dierickx and Cool, 1989a) has an important implication for these relationships, in that the output of each phase is the input for the next one (e.g., the generated, tried, and tested knowledge of each phase is carried to the next one), and thus building the capability of each phase is essential to build the next phase capability. Past research is consistent with this claim, and shows that the development of radical innovation has an evolutionary nature (e.g., Nelson and Winter, 1977). Veryzer (1998) finds that there is an extremely high degree of technological and market uncertainties, and that the reduction of these uncertainties results in a sequence of innovations. Davies and Brady (2000) find that the organizational learning process associating the development and implementation of radical innovations is path dependent. The work of Salomo, et al. (2007) suggests that the proficiency of managing the direction phase is causally linked to the incubation phase.

Due to the evolutionary nature of radical service innovation, it is concluded that the proficiency of undertaking the incubation activities have a critical implication for the proficiency of the acceleration activities. In other words, lacking a capability in the preceding phase has a negative impact on the following one. Contrarily, building a higher capability in the preceding phase is a critical success factor for the next one. All in all, the previous finding and discussion provide support for the following proposition:

\[ P_3: \text{The existence of the incubation capability is necessary for building the acceleration capability.} \]

### 10.2.4 Linking the Acceleration Capability to TCA (P4A-P4B)

Table 8.6 compares between banks A and Z, and shows that bank Z has accumulated a superior acceleration capability. More specifically, banks A and Z are similar in three aspects: (1) providing finance to under-bankable segment; (2) with the same price (6.5 cut interest rate); and (3) with similar quality (e.g., speed, easy procedures, the service as a whole is correct). However, bank Z has been better than bank A in the following aspects: (4) modern servicescape; (5) undertaking formal and systematic training for all people involved in producing, delivering, and selling the financial product; (6) designing creative media campaign (the use of personal selling, and the significant, attractive, easy-go educational content); and (7) attracting the early adopters and stimulating the word of mouth and referral behavior. Moreover, word table 9.3
compares between banks A and Z along the first-order factors of the customer perceived value construct: (1) satisfying unmet customer needs; (2) functional value price; (3) functional value of the service purchased, quality; (4) functional value of the establishment, installations; (5) functional value contact personnel, professionalism; (6) emotional value; and (6) social value. This word table also links between the 7 aspects and 7 first-order latent factors of customer perceived value.

Based on these comparisons, it is concluded that accumulating superior acceleration capability explains the superior customer perceived value. That is because factors 4-7 of the customer perceived value are explained by aspects 4-7. In other words, the superior customer perceived value is explained by the superior acceleration capability (and the decisions taken during the acceleration phase). However, as bank Z has been able to deliver this superior customer perceived value but with higher cost, it is concluded that the bank Z has generated effectiveness advantage.

Past research provides support for this relationship. For example, Cronin et al. (2000) find that introducing services with higher quality has a positive impact on the customer perceived value. Sánchez et al. (2006) and Roig et al. (2006: 267) state that the customer “perceived value is the essential result of marketing activities”, which are undertaken during the acceleration phase. Other studies also suggest that the first-order factors of the customer perceived value are explained by several aspects characterizing the acceleration phase. For example, the significant educational content, which is designed during the implementation step, adds value. In general, the advertising campaign does not only raise customers’ awareness of the new product and its capabilities, and offer them incentives to make the necessary changes in their behavior, but also facilitates the accumulation of knowledge and the development of skills required to play their co-production role in such a complex process of replacement. Furthermore, giving extensive training to personnel (especially front-line employees), and designing fast adaptive control system (seeking the identification and correction of errors and gaps) enhance the professionalism and product quality, two factors within the customer perceived value (Alam and Perry, 2002; Atuahene-Gima, 1996; Lovelock and Wirtz, 2007; Scheuing and Johnson, 1989; Tax and Stuart, 1997).

The sole radical innovation project investigated seeks to satisfy unmet customer and society needs, and provides support for the acceleration capability-effectiveness
advantage relationship. However, past innovation research, which addresses the acceleration capability, finds that some radical innovations seek to achieve a significant reduction in cost, 30-50% or greater (McDermott and O'Connor, 2002; O'Connor and DeMartino, 2006; O'Connor, et al., 2002). This type of innovation, thus, will enable the radical innovation to achieve efficiency advantage. As a result, I believe that I should keep the superior acceleration capability-efficiency advantage although I do not have empirical evidence to support this relationship. All in all, the previous findings and discussions show that the effectiveness or efficiency advantage is the outcome of accumulating superior acceleration capability. Based on the previous, the following relationships are proposed:

\[ P_4: \text{The existence of superior acceleration capability is necessary for generating effectiveness advantage (P}_{4A}; \text{ or efficiency advantage (P}_{4b}). \]

10.2.5 Linking TCA to Sustainability of this TCA (P_5, P_6A-P_6C)

Chapter 9 analyzes two competitive situations: the financial product of vehicle replacement (banks A, C, L, and Z); and the Private Banking Product (banks D, E, F). The findings show that banks Z and D have been able to generate TCA (effectiveness advantage), and that the competitor efforts sought to duplicate this TCA have ceased. Thus, the CA generated continues to persist, and is said to be sustained (SCA). However, three main categories of imitation barriers are found to be essential to be able to sustain the TCA generated. These are: (1) managing through the life cycle (incremental innovation; and managing asset erosion); (2) complexity (causal ambiguity and uncertain imitability); and (3) nontradeability (time compression diseconomies; and interconnectedness of asset stocks). In other words, the findings suggest that the TCA-SCA relationship is moderated by the three categories of imitation barriers.

Past research provides support for these relationships. According to dynamic theories of competition (Bharadwaj, et al., 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Kerin, et al., 1992; Lengnick-Hall, 1992; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999), the TCA is said to be sustained when it lasts a longer time, and the attempts of competitive duplication are ceased. However, due to the fierce competition, these theories of competition argue that the TCA cannot be sustained unless a set of imitation
barriers exists, hence the essential role played by imitation barriers in moderating the TCA-SCA relationship. In this respect, the following categories of barriers are suggested: (1) isolating mechanisms (causal ambiguity, and uncertain imitability); and (2) resource/skills stock (time compression diseconomies, and interconnectedness of resources/skills stock). In other words, past research suggests that the TCA-SCA is a contingent (not a universalistic) relationship. All in all, the previous findings and discussion suggest that the ability of the radical innovator to sustain the TCA is contingent on three categories of imitation barriers. Based on this previous, the following contingent and moderating relationships are proposed:

\[ P_5: \text{The TCA-SCA relationship is contingent on three imitation barriers.} \]

\[ P_{6A} - P_{6C}: \text{Managing through the life cycle moderates the TCA-SCA relationship (P}_{6A}). \text{Complexity moderates the TCA-SCA relationship (P}_{6B}). \text{Nontradeability moderates the TCA-SCA relationship (P}_{6C}). \]

**10.2.6 Linking SCA to Superior Long-term Financial Performance (P7)**

Superior long-term financial performance is presented as the ultimate outcome construct. In this respect, the findings show that banks Z and D, which are able to generate SCA, have been able to generate superior financial performance along several subjective and objective measures. *This is partially consistent with past research.* (This partial support is due to the fact that the time span of the two competitive situations analyzed is not long. It ranged between 2-4 years.) According to dynamic theories of resources-based competition, the superior long-term financial performance is explained by the SCA the radical innovator creates (Bharadwaj, *et al.*, 1993; Hunt, 1997a, 1997b, 1999, 2000a; Hunt, 2000b; Hunt, 2001; Hunt and Duhan, 2002; Hunt and Morgan, 1995, 1996, 1997; Kerin, *et al.*, 1992; Madhavaram and Hunt, 2008; McGrath and Ming-Hone, 1996; Morgan and Hunt, 1999). The previous finding and discussion provide support for the following proposition:

\[ P_7: \text{The SCA is key to generate superior long-term financial performance.} \]
10.2.7 Linking Superior Long-term Financial Performance to Core RIC (P_8)

In Chapter 5, it is theoretically argued that the Core RIC would be explained only by the entrepreneurial (resource building) capability. However, some of the measures cited in the ultimate outcome variable suggest a causal relationship between the superior long-term performance and Core RIC. More specifically, two subjective success measures feed back into the R&D capability and strategic relationships. These are: building the innovation routine (learning effects), and building and enhancing strategic relationships. Other objective measures, like sales, growth, and profitability have a similar impact on other dimensions underlying the Core RIC, like innovation-friendly culture. As shown in word table (7/50), “promoting the success stories of previous new products” is suggested as a soft tool used to reduce resistance and accept change. This, however, may require quantitative figures, like the sales of the new product.

This new proposition is consistent with past research. For example, in their conceptual model, Bharadwaj, et al. (1993) suggest that the superior long-term (market and financial) performance is critical to maintain the sources of competitive advantage (e.g., innovation skills). This is also consistent with what Leifer, et al. (2000: 69) call “data win”, when resisters within the firm waving their arms in protest, hard data are “waved in their faces”. They cite this as a tool establishing project legitimacy. The previous findings and discussion provide support for the following new research proposition:

\[ P_8: \text{The superior long-term performance is critical to maintain the Core RIC.} \]

10.3 Summary

This chapter has sought to synthesize the constructs of the multi-layer conceptual framework (LI, LII, and LIII) by developing the research propositions. As such, this chapter represents the central argument of the current research. The entrepreneurial (resource building) capability is necessary to build the Core RIC, which is necessary to accumulate the capabilities of radical innovation project management (incubation and acceleration). Moreover, the incubation capability is necessary to build the acceleration capability. Furthermore, building a superior acceleration capability is essential to generate temporary competitive advantage (TCA). This temporary competitive advantage can be sustained (SCA) only if a set of imitation barriers are effective. In
other words, imitation barriers moderate the TCA-SCA relationship. In addition, the generation of SCA leads to achieving superior long-term performance (the ultimate outcome variable). Finally, the superior-long term performance is necessary to maintain the Core RIC.

Chapter 11 will conclude the thesis by reflecting on the central research objective set up at Chapter 1, discussing the research contribution, and suggesting future research directions.
Chapter 11 Conclusion

I will start this chapter by re-examining the research objective set up at the beginning of the thesis. I will then summarize the stages of the research development. Following is a synthesis of the key findings of the research. The contribution to knowledge will be addressed by outlining the theoretical, methodological, and practical contributions as well as policy implications. The chapter concludes by identifying the limitations, and suggesting future research directions.

11.1 Reflections on Research Objective

The major research objective stated in the Introduction Chapter was to develop an evolutionary (multi-layer) conceptual framework for the key capabilities and competences of radical innovation success in the Egyptian banking sector. More specifically, the central objective was decomposed into two sub-objectives: to develop the theoretical constructs of radical innovation capabilities and competences and its key success/performance in the Egyptian banking sector; and to develop the causal links among these theoretical constructs. The central objective has been met by developing a multi-layer conceptual framework, delivering a consistent and comprehensive set of constructs, and the propositions linking these constructs. In the next section, I will show how the current research has met this central objective.

11.2 Research Summary

In Chapter 1, I presented and discussed the knowledge gaps. The overall knowledge gap was formulated as follows: there is a lack of a multi-layer (evolutionary or dynamic) conceptual framework for the key capabilities and competences of radical innovation success in the service context. I stratified this wide gap of knowledge into three layers. LI was related to the capabilities and competences required before the initiation of RI projects: entrepreneurial (resource building) capability; and core radical innovation competence (Core RIC). LII was related to the capabilities of RI project management: discovery (direction) capability; incubation capability; and acceleration capability. LIII was related to how to assess the success/performance of radical service innovation, and how to sustain such success. Based on these three layers of knowledge gaps, four research questions were formulated. I also discussed the key roles played by banks in
In Chapter 2, I overviewed the research context in which the empirical study was undertaken. I provided key data for Egypt, and briefly discussed the nature of the Egyptian economy. The following was an overview of the Egyptian banking sector: its history; its structure; and its financial products and services. I also presented a rationale and justification for choosing the banking sector as the field of empirical investigation. Finally, I discussed the context of the NPVR. I discussed the baseline context giving rise to the replacement program. Also, I compared between the NPVR and other international replacement programs along several aspects. I also presented a snapshot for the NPVR (e.g., the Clean Development Mechanism (CDM) component; and the process map of replacement). I also developed a stylized owner spreadsheet model to examine the replacement problem of a profit-maximizing vehicle owner. Moreover, I presented a comprehensive list of the impact of the NPVR on the baseline context (the benefits). During this section, the relevant literature was reviewed.

In Chapters 3-5, I explored the relevant literature to connect this study with existing theory and prior research. In Chapter 3, I presented and discussed two critical aspects of any innovation study: innovation approaches; and innovation typologies. In the first section, I discussed several scholars’ views of innovation, and situated the current research project within the process stream of innovation research. In the second section, I discussed three issues of past innovation typologies (ambiguity; misclassification of the degree of innovativeness; and inconsistency), and I suggested the characteristics-based approach of innovation due to its ability to overcome these issues. In this respect, two theoretical parts were presented and discussed: the characteristics-based representation of a product; and four innovation modes (types), including the RI mode. In Chapter 4, I presented a critical literature review for: drivers of service innovation, covering LI and LII; and success/performance assessment, covering LIII. At the start of each section, several theories and concepts were presented and discussed. Following this was conducting a systematic literature review to identify the gaps, deficiencies, and issues that the current research project intended to fill in and deal with. In Chapter 5, I sought to suggest an analytical, multilayer conceptual framework, addressing the three layers of research questions (LI, LII, and LIII). That is the theoretical constructs (and their
dimensions) were suggested, and the propositions linking these constructs were developed.

In Chapter 6, I adopted the layers of “research onion” introduced by Saunders, et al. (2009) when outlining the methodology employed in the current research project. In this respect, I provided a detailed discussion and justification for all the choices made. These included: (1) the research philosophy (the constructionist paradigm, which discussed from the point view of ontology, epistemology, and axiology); (2) the research approach (the induction approach used when building theory, though with preconception based on thought trails), and the notion of theoretical concepts as multidimensional constructs; (3) the research strategy (the case study strategy, its design, its advantages, and the sampling methods employed); (4) the choice (multi-method qualitative study); (5) the time horizon (longitudinal, retrospective); (6) the data collection techniques (semi-structured interviews, documents, and observations), the tactics followed to overcome the main disadvantages of the first two techniques, and the ethical issues considered; (7) the data analysis procedures (a common framework, which included narrative strategy and synthetic strategy). Moreover, I discussed the quality criteria of research designs (construct validity, internal validity, external validity, and reliability), and the tactics implemented to satisfy these criteria. I concluded this chapter by listing the obstacles of conducting the field study.

The findings of the empirical study were presented and discussed in Chapters 7-10. In Chapters 7-9, I presented and discussed the key findings related to LI, LII, and LIII, respectively. In Chapter 10, the research propositions linking the constructs were developed. In this respect, the key findings will be summarized and discussed in the next section.

11.3 Synthesis of Key Findings

There are two key main findings of the current research. The first is a process model for radical service innovation management. This is the outcome of the process strategy of data analysis. The second is a multi-layer conceptual framework for the key capabilities and competences of radical service innovation performance in the Egyptian banking sector. This is the outcome of the synthetic strategy of data analysis.
11.3.1 A Process Model for Radical Service Innovation Management

I have followed the life-cycle of a radical service innovation project at the national level (the NPVR), from its inception to introduction (as shown in table 8.1, and presented in section 8.1). I chronologically documented its events, activities, and choices. Table 11.1 presents the sequence of the main phases and steps of this radical service innovation project. Please recall that this process model is not the final outcome of the current research project. Methodologically, this process model is prepared to serve as an intermediary database for the creation of the constructs of LII and the formulation of propositions linking these constructs. However, due to the fact that longitudinal research sought to structure radical service innovations into recognizable phases and steps is rare, I decided to present it as a stand-alone key finding, due to its theoretical and practical contribution.
Chapter 11 Conclusion

Table 11.1: A Process Model for Radical Service Innovation Management

<table>
<thead>
<tr>
<th>Findings (Phases and Steps)</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>The Direction Phase (A key strategic partner for a national bank was responsible for all activities of the direction phase)</strong></td>
<td></td>
</tr>
<tr>
<td>1 Setting Objectives</td>
<td>The top management team (TMT) sets objectives to explore new business opportunities. These objectives may be guided by: (1) general technical and/or market needs or issues (which was evident in the case study investigated); (2) a determined champion or visionary, who has a sense of both the technology and market (Veryzer, 1998); or (3) the ambition to investigate whether there are further opportunities of which the TMT is not yet aware (Penrose, 1959).</td>
</tr>
<tr>
<td>2 Idea Generation</td>
<td>The breakthrough idea (row solution) may grow out of: (1) several small scale pilot projects (which was evident in the case study); (2) exploratory marketing studies (O'Connor and DeMartino, 2006; Veryzer, 1998); or brainstorming sessions (Story, et al., 2011).</td>
</tr>
<tr>
<td>3 Opportunity Recognition</td>
<td>Proactive studies (market, economic, and other studies, e.g., environmental studies) are undertaken by the idea owner to: get more understanding about the baseline context and its issues; and recognize the potential of the opportunity (which was evident in the case study). Moreover, these studies are essential when the degree of familiarity with the technical and market aspects of the opportunity is low (O'Connor and DeMartino, 2006). Furthermore, the existence of opportunity recognizers is essential to validate and articulate this opportunity (Rice, et al., 2001; Story, et al., 2011).</td>
</tr>
<tr>
<td>4 Recommendations</td>
<td>After clarifying the market needs and justifying the opportunity, the team (of the idea owner) recommends going forward for further development as an official innovation (which was evident in the case study).</td>
</tr>
<tr>
<td><strong>The Incubation Phase (one national and one international bank were key actors in this phase)</strong></td>
<td></td>
</tr>
<tr>
<td>1 Assigning the New Venture Champions</td>
<td>Each key actor of the cooperative partners assigns a new venture creation to lead the incubation phase (please note that the personal characteristics of this champion are listed in word table 8/3). This champion plays two key roles: incubate; and integrate (which was evident in the case study). The work of Leifer, et al. (2000) provides support for the first role, while the work of Story, et al. (2011) provides support for the second role.</td>
</tr>
<tr>
<td>2 Setting Clear Objectives</td>
<td>Guided by the results and recommendations of the direction phase, the champions of the cooperative teams should set clear objectives with regard to the direction (strategic goal) of the innovation project, but not regarding the means by which these objectives would be achieved. The means is the responsibility of the incubating teams. Thus, while the objectives (ends) should be clear, the means should be flexible. This is consistent with the relevant literature. The clarity of objectives is important to prevent the innovation activities from becoming uncontrolled. The flexibility of the means is critical to: be able to explore the unknown and learn new skills; create a sense of urgency, challenge, and ownership; and stimulate creativity (e.g., Amabile, 1998; McGrath and MacMillan, 2000; Salomo, et al., 2007; Sundbo, 1997).</td>
</tr>
<tr>
<td>3 Team Preparation</td>
<td>Team preparation was a very quick step, represented in three main tasks: clarifying the strategic goal of the project; stressing the importance of exploration when creating the business model (mechanism); and reminding the Generalist Development Team (GDT) of bank A about building the ship concept (that the roles and responsibilities of partners in the new business model built to service the innovation should be identified clearly, and also well integrated). While team preparation is also identified in the innovation literature as an important step, the contents of preparation observed were different from the ones suggested by the literature (e.g., setting the team expectations regarding the multiple technical and market uncertainties they have to deal with; and educating the team members regarding how to deal with these uncertainties (e.g., Leifer, et al., 2000)). Thus might be explained by the fact that the bank position within the newly built business model was not totally new, and thus the innovation had less disruptive impact. Thus, it is concluded that if the bank position within the new business model is really new, the number of technical and market uncertainties will be high, and the team would need more preparation with regard to how to tackle uncertainties and surprises, and how to maximize learning.</td>
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<tr>
<td>4 Studying Similar Projects</td>
<td>Studying similar experiences (e.g., international replacement programs) may prevent the teams form reinventing the wheel. This is consistent with the innovation literature. For example, Griffin (1997) finds that studying NPD best practices (e.g., the development tools) is very useful, despite the fact that many of these best practices are context-specific.</td>
</tr>
<tr>
<td>5 Concept Creation (Formulation)</td>
<td>The relevant partners and suppliers are involved in this step. The market needs and issues identified in the opportunity recognition are clarified, detailed, and updated. A clear and comprehensive concept is created. The roles and responsibilities of each actor participated, including the final customer as a service co-producer, are identified. Brainstorming sessions are essential. This is more akin to what Veryzer (1998) calls formulation.</td>
</tr>
<tr>
<td>6 Preliminary Process Design and Integration</td>
<td>Based on the comprehensive concept created and the clear roles and responsibilities identified, the internal process of each player is developed. Moreover, the whole workflow should be integrated. This is more akin to what Veryzer (1998) calls preliminary design.</td>
</tr>
<tr>
<td>7 Business Analysis (Evaluation Preparation)</td>
<td>To ensure that the business case will be complete, several analyses are needed (e.g., SWOT analysis, profitability analysis, sensitivity analysis, and stressing test) to cover the business implications of the opportunity. Another characteristic of the business case prepared by the development team is to be good (well developed and based on clear and logical assumptions). Past research provides supports for step. Regarding the complete and good business case, Veryzer (1998) finds that the development team prepare for formal reviews by developing “a strong case for continuing the project”. Moreover, Salomo, et al. (2007) also find that the team should conduct an initial risk analysis to address the risk, and show how the technological and market uncertainties will be overcome.</td>
</tr>
<tr>
<td>8 Project Authorization</td>
<td>The evaluation committee should have constructive thinking (e.g., being able to enhance the process or discover any leak), have the ability to imagine the opportunity potential, and be</td>
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</table>
The Acceleration Phase (Commercial banks were key actors in this phase through the participation of the Fund designed to be responsible for managing this phase)

1. Project authorization and transition
   - Before transiting the innovation to the acceleration phase, the development team of the bank should update the business case (memo) to reflect any changes have been taken place, e.g., changes in the concept, changes in the business models, and changes in the competitive situation (e.g., if new competitor banks are expected to join the product launch). The TMT will be responsible for: authorizing the project; choosing the best division responsible for managing the product; and forming the team responsible for transitioning the product to the receiving division. The transition team should include: push and pull transition champions; members from the development team in addition to members from the receiving unit; and transition experts. This is consistent with past research. For example, several scholars (Chandy and Tellis, 1998; Ettlie, et al., 1984; Morris and Westbrook, 1996; O'Connor, et al., 2002) find that having two champions is essential to accelerate the transition process. Assessing the transition and integration readiness in a formal and systematic way is found to be lacking in the case study. However, as argued by Tax and Stuart (1997) and O'Connor, et al. (2002) assessing the transition readiness is critical to reduce several uncertainties, especially if the innovation will be integrated into the current service system.

2. Implementation
   - This includes implementing the transition plan and completing the development process, e.g., completing the font- and back-office operations development; coding the operational details into the technological medium; developing the service recovery procedures; and identifying the number of branches involved in the hard launch (an aggressive launch sought to consolidate the market and catch the opportunity).

3. Media Campaign
   - Designing an effective media campaign that has significant, attractive, and easy-to-go educational content; stimulates the word-of-mouth and referral behaviors, especially among the early adopters; is consistent across the various production and marketing channels; and is transmitted through the media most suited to reach the intended segment.

4. Personnel Training, Evaluation, and Compensation
   - Following more formal, interactive form of training (e.g., training workshops) for all employees involved in the production and delivery of the new service (e.g., front- and back-office employees, and sales people). This step also includes designing suitable performance metrics and rewards.

5. Launch and Review (Introduction)
   - The product lunch may need to be hard, especially if the response lag is expected to be short. In this respect, designing a fast adaptive control system is essential. In this system, a continuous monitoring (or daily watch) is followed in the first few months sought to incorporate the newly acquired learning into the system of vectors, especially the process. This system is essential to insure that the new product is well-based. Being well-based facilitates copy exactly (capability replication) when expanding the market geographically (rolling out). That is the successful main branch in one zone is assumed the responsibility of the retail manager, being responsible for replicating success in other branches in the same zone.

6. Incremental (Continuous) Innovation
   - Incremental (continuous) innovations are imperative. This is consistent with the innovation literature. Several scholars argue that incremental innovations are critical to create variety, extend the dominant design, and enhance the fitness (degree of adaptation or suitability) of the radical innovation to its environment (Drew, 1995; Gallouj, 2002; Garcia and Calantone, 2002; Story, et al., 2011).

Source: Self.
11.3.2 The Multi-layer Conceptual Framework

As shown in Chapters 7-9, another level of analysis, the synthetic strategy, was implemented to conclude the theoretical constructs of LI, LII, and LIII. As shown in Chapter 10, the propositions linking these constructs were developed. The theoretical constructs are listed in table 11.2. Moreover, the research propositions are shown in figure 11.1, and formulated in table 11.3.
### Table 11.2: The Theoretical Constructs of the Multi-layer Conceptual Framework

<table>
<thead>
<tr>
<th>Layer</th>
<th>Theoretical (Third-order) Constructs</th>
<th>Theoretical (Second-order) Dimensions/Constructs</th>
<th>First-order Latent Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI: CH 7</td>
<td>Entrepreneurial (Resource Building) Capability</td>
<td>-Executives as Capability Patrons; -Executives as Shapers of Culture; and -Executives as Engineers (Architectures).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Core Radical Innovation Competence (Core RIC), a superordinate construct manifested by five theoretical (second-order) dimensions</td>
<td>R&amp;D Capability</td>
<td>-Team Capability (Generalist Development Team, and Cross-Functional Team); -Proactive Research Capability; -Network of Contributors; and -Potential Absorptive Capacity.</td>
</tr>
<tr>
<td></td>
<td>IT Capability</td>
<td>Hardware and Infrastructure; -Universal CORE banking &amp; Other Enabling Software; and -IT Experience.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperative (Networking) Capability</td>
<td>-Filling the Competence Gap; -Building a High Level of Trust; -Sustaining Growth; -Enhancing Mutual Adaptability; -Creating the Innovation Routine (Coordination); -Easing Crisis; -Developing Effective Communications; -Reducing Uncertainty; and -Reducing Cost.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Managerial Systems</td>
<td>Effective Mechanism for Internal Selection; -Effective Training Mechanism; -Entrepreneurial Retention (Rewards and Promotions); and -Job Rotation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Innovation-friendly Culture</td>
<td>-Sharing Knowledge; -Providing Support; -Taking Risk; and -Accepting Change.</td>
<td></td>
</tr>
<tr>
<td>LII: CH 8</td>
<td>Project Management Capabilities (Incubation Capability)</td>
<td>Assigning New Venture Champion</td>
<td>-Champion as Incubator; and -Champion as Integrator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishing Entrepreneurial Frame</td>
<td>-Setting Clear Strategic Objectives; and -Flexibility of Means.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formulation and Preliminary Design</td>
<td>-Studying Similar International Experiences; -Creating a Clear and Comprehensive Concept;</td>
</tr>
</tbody>
</table>
## Chapter 11 Conclusion

### Designing Preliminary Processes and Integrating them into a Clear Workflow.
- Effective Evaluation
  - Preparing Strong (Complete and Good) Business Case; and
  - Entrepreneurial and Constructive Evaluation by the TMT.
- Rapid Prototyping and Live Experimenting
  - Developing Quick (Crude) Prototype;
  - Close and Continuous Monitoring (when going live to experiment);
  - Flexibility;
  - Open Communication among Partners;
  - Synthesizing the Step-functional Learning Accumulated.
- Building and Finalizing the Business Model
  - Understanding and Experimenting with the Entire Value Chain;
  - Identifying the Weaknesses and Threats of the Acceleration Phase; and
  - Designing Strict Partnership Agreements.

### Project Management Capabilities (Acceleration Capability)
- Managing the Transition to Operations
  - Assembling a Transition Team;
  - Assigning (Push and Pull) Transition Champions; and
  - Assessing the Transition and Integration Readiness.
- Implementation
  - Physical Implementation;
  - Well-designed Media Campaign; and
  - Personnel Training, Evaluations, and Compensation.
- Introduction
  - Fast Adaptive Control System; and
  - Capability Replication.

### Construct

<table>
<thead>
<tr>
<th>LIII: CH 9</th>
<th>First-order latent factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success/Performance Measurement of Radical Service Innovation</td>
<td>The Customer Perceived Value (measured by the following 7 first-order latent factors):</td>
</tr>
<tr>
<td></td>
<td>- Functional value of the establishment, installations;</td>
</tr>
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<td></td>
<td>- Functional value contact personnel, professionalism;</td>
</tr>
<tr>
<td></td>
<td>- Functional value of the service purchased, quality;</td>
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<td></td>
<td>- Functional value price;</td>
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<td></td>
<td>- Emotional value;</td>
</tr>
<tr>
<td></td>
<td>- Social value; and</td>
</tr>
<tr>
<td></td>
<td>- Satisfying unmet customer needs.</td>
</tr>
<tr>
<td></td>
<td>The Cost of Developing, Producing, and Delivering the Total Market Offering</td>
</tr>
<tr>
<td>Temporary Competitive Advantage (TCA):</td>
<td>Sustainable Competitive Advantage (SCA)</td>
</tr>
<tr>
<td>- Effectiveness (Differentiation) Advantage (Superior Customer Perceived Value but with Party Cost); or</td>
<td>- Sustainable Effectiveness (Differentiation) Advantage; or</td>
</tr>
<tr>
<td>Imitation Barriers, Moderating the TCA-SCA Relationship</td>
<td>Managing through the Life Cycle:</td>
</tr>
<tr>
<td></td>
<td>- Continuous Innovation; and</td>
</tr>
</tbody>
</table>
### Chapter 11 Conclusion

- Managing the Asset Erosion.
- Complexity:
  - Causal Ambiguity, and
  - Uncertain Imitability.
- Nontradeability:
  - Time Compression Diseconomies; and/or
  - Interconnectedness of Asset Stocks.

<table>
<thead>
<tr>
<th>Superior Long-term Financial Performance</th>
<th>Superior Long-term Financial Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Sales (Market Share);</td>
</tr>
<tr>
<td></td>
<td>- Growth;</td>
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<td></td>
<td>- Cross-selling;</td>
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<td></td>
<td>- Corporate Social Responsibility</td>
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<tr>
<td></td>
<td>(Corporate Reputation);</td>
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<tr>
<td></td>
<td>- Building the Innovation Routine</td>
</tr>
<tr>
<td></td>
<td>(Learning Effects);</td>
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<tr>
<td></td>
<td>- Building &amp; Enhancing Strategic</td>
</tr>
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<td></td>
<td>Relationships;</td>
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<td></td>
<td>- Profitability (Product, Segment,</td>
</tr>
<tr>
<td></td>
<td>and Total).</td>
</tr>
</tbody>
</table>

Source: As shown in figures 7.7 (Entrepreneurial Capability); 7.6 (Core RIC); 8.7 (Incubation Capability); 8.11 (Acceleration Capability); and 9.1 (Success/Performance Measurement); and 9.2 (Customer Perceived Value).
Figure 11.1: The Multi-layer Conceptual Framework (An Abstract Form)

<table>
<thead>
<tr>
<th>Layer I (LI)</th>
<th>Layer II (LII)</th>
<th>Layer III (LIII)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$P_1$</td>
<td>$P_{2A}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$P_{2B}$</td>
</tr>
<tr>
<td></td>
<td>Core: Superordinate Theoretical (Third-order) Construct</td>
<td>Incubation Capability: Theoretical (Third-order) Construct</td>
</tr>
<tr>
<td></td>
<td>$P_2$</td>
<td>$P_3$</td>
</tr>
<tr>
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<tr>
<td>Source: Self.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11.3: The Relationships among the Constructs

| $P_1$ | The existence of the entrepreneurial (resource building) capability is necessary to accumulate the Core RIC. |
| $P_{2A}$ $P_{2B}$ | The existence of Core RIC is necessary for building the incubation capability ($P_{2A}$); and the acceleration capability ($P_{2B}$). |
| $P_3$ | The existence of the incubation capability is necessary for building the acceleration capability. |
| $P_4$ | The existence of superior acceleration capability is necessary for generating effectiveness advantage ($P_{4A}$); or efficiency advantage ($P_{4B}$). |
| $P_5$ | The TCA-SCA relationship is contingent on three imitation barriers. |
| $P_{6A}$ $P_{6C}$ | Managing through the life cycle moderates the TCA-SCA relationship ($P_{6A}$). Complexity moderates the TCA-SCA relationship ($P_{6B}$). Nontradeability moderates the TCA-SCA relationship ($P_{6C}$). |
| $P_7$ | The SCA is key to generate superior long-term financial performance. |
| $P_8$ | The superior long-term performance is critical to maintain the Core RIC. |

Source: Self.
As shown in table 11.2, the findings show that key to the success of radical service innovation is a complex set of capabilities and competences. These are: entrepreneurial (resource building) capability, theoretical (second-order) construct; core radical innovation competence (Core RIC), superordinate (third-order) construct; incubation capability, theoretical (third-order) construct; and acceleration capability, theoretical (third-order) construct. Moreover, the performance of radical innovation is assessed through four categories of constructs. The first category is temporary competitive advantage (TCA), which may be: effectiveness advantage (superior value but with parity cost); or efficiency advantage (parity value but with lower cost). The second category is sustainable competitive advantage (SCA), which is said to be generated when the competitor efforts sought to duplicate the TCA have ceased. The third category is a set of imitation barriers. The fourth category is the superior long-term financial performance.

As shown in figure 11.1 and table 11.3, the findings show that the entrepreneurial (resource building) capability is causally linked to the Core RIC ($P_1$), which is causally linked to both the incubation and acceleration capabilities ($P_{2A} - P_{2B}$). The findings also show the incubation capability is causally linked to acceleration capability ($P_3$). The acceleration capability, on the other hand, is causally linked to TCA, which may be effectiveness advantage or efficiency advantage ($P_{4A} - P_{4B}$). The findings also show that the TCA-SCA relationship is contingent ($P_5$), and moderated by three imitation barriers: managing through the life cycle ($P_{6A}$); complexity ($P_{6B}$); and non-tradeability ($P_{6C}$). Moreover, the SCA is causally linked to the superior long-term financial performance ($P_7$). Finally, the superior long-term financial performance is causally linked to the Core RIC ($P_8$).

As shown in table 6.9, establishing a chain of evidence is one tactic should be implemented to enhance the construct validity and reliability. In this respect, the initial research questions (Chapter 1) need to be linked to the theoretical framework (Chapter 5), which needs to be linked to the case study questions (Appendix A.4), which need to be linked to the case study findings (Chapters 7-10), which need to be linked to the ultimate case study conclusion. Table 11.4 presents a chain of evidence linking the research objectives to research contribution.


**Table 11.4: Establishing a Chain of Evidence**

<table>
<thead>
<tr>
<th>The Central Objective (CH 1)</th>
<th>Research Questions (CH 1)</th>
<th>Proposed Conceptual Framework (CH 5)</th>
<th>Data Collection &amp; Analysis</th>
<th>Findings</th>
<th>Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop the theoretical constructs of radical innovation capabilities and its key success/performance in the Egyptian banking sector</td>
<td>Q: What are the dimensions of entrepreneurial (resource building) capability required to build the core radical innovation competence (Core RIC)?</td>
<td>-Entrepreneurial (resource building) capability: theoretical (second-order) construct.</td>
<td>-Card 7.</td>
<td>-Yes.</td>
<td>-NA.</td>
</tr>
<tr>
<td></td>
<td>Q: What are the dimensions of Core RIC that need to be accumulated before the initiation of radical service innovation projects and how such core competence could be accumulated?</td>
<td>-Core RIC: superordinate (third-order) construct.</td>
<td>-Cards 1-6.</td>
<td>-Yes.</td>
<td>-NA.</td>
</tr>
<tr>
<td>Layer II (LII)</td>
<td>Q: What are the capabilities required to effectively manage RI projects in the service context?</td>
<td>-Direction capability: theoretical (third-order) construct.</td>
<td>-Card 8.</td>
<td>-Yes.</td>
<td>-NA.</td>
</tr>
<tr>
<td></td>
<td>-Incubation capability: theoretical (third-order) construct.</td>
<td>-Card 9.</td>
<td>-Yes.</td>
<td>-NA.</td>
<td>-Negative evidence regarding the direction capability (section 8.4.1).</td>
</tr>
<tr>
<td>Layer III (LIII)</td>
<td>Q: What are the key success/performance measurement of radical service innovation and how such success could be sustained?</td>
<td>-Temporary competitive advantage (TCA): effectiveness advantage; or efficiency advantage.</td>
<td>-Card 11.</td>
<td>-Yes.</td>
<td>-NA.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Sustained competitive advantage (SCA) &amp; Imitation Barriers.</td>
<td>-Card 12.</td>
<td>-Yes.</td>
<td>-NA.</td>
</tr>
<tr>
<td>To develop the causal links among these theoretical constructs.</td>
<td>-Research propositions were suggested (Figure 5.1).</td>
<td>-Process narrative was woven from the threads of interviews and documents, aimed at preparing chronology (sequence in time). -This chronology became the initial basis for causal inferences.</td>
<td>-Developed in CH 10, and summarized in figure 11.1 and table 11.3.</td>
<td></td>
<td>-Longitudinal evidence.</td>
</tr>
</tbody>
</table>

**Source:** Self.
11.4 Contribution to Knowledge

This section outlines the theoretical, methodological, and practical contributions as well as policy implications.

11.4.1 Theoretical Contribution

Before conducting this research project, several scholars (e.g., Chandy and Tellis, 1998; Herrmann, et al., 2006; Kraaijenbrink, et al., 2010; Lengnick-Hall, 1992; Montoya-Weiss and Calantone, 1994; Nelson and Winter, 1977; Newbert, 2007; O'Connor and DeMartino, 2006; Page and Schirr, 2008; Salomo, et al., 2007; Salunke, et al., 2011; Veryzer, 1998) have called for developing comprehensive, multi-layer (evolutionary or dynamic) conceptual frameworks for corporate entrepreneurship capturing the interaction between: the way by which corporate competences are built and configured; innovation is managed; and competitive advantage is generated and sustained. Moreover, these calls have also strongly recommended employing longitudinal qualitative research design and adopting the competence-based view of the firm, and that that these conceptual frameworks must be articulated in such a way that can be subjected to empirical investigation. More specifically, several calls have been made to conduct a longitudinal research on the key capabilities and competences of radical innovation success. This need, however, has represented a substantial void. In this respect, the current research project has made several theoretical contributions.

A multi-layer (evolutionary or dynamic) conceptual framework

By adopting the major principles of the competence-based view of the firm and employing a longitudinal qualitative research design, the current research project has been able to develop a multi-layer (evolutionary) conceptual framework that can push the development of more rigorous theory by enabling future research activities on a quantitative basis.

The entrepreneurial capability (original construct)

The entrepreneurial (resource building) capability construct represents a theoretical contribution, especially to the entrepreneurship literature. Past entrepreneurship research (e.g., Moreno and Casillas, 2008; Salunke, et al., 2011) has often conceptualized this capability in terms of three conventional dimensions of
entrepreneurial orientation (innovativeness, proactiveness, and risk taking), and to link this construct to distinct concepts rather than a resource *bundle* (e.g., Core RIC).

**The Core RIC (a significantly re-conceptualized construct)**

The Core RIC construct represents a theoretical contribution as it represents a significant re-conceptualization of the construct previously developed by Leonard-Barton (1992). She conceptualizes core NPD competence as a superordinate construct manifested by the skills and knowledge embodied in people; knowledge embedded in technical systems; managerial systems; and corporate culture. Moreover, she does not develop the first-order latent factors of each dimension.

**Incubation and acceleration (original constructs)**

The project management capability (incubation and acceleration) constructs are original. While O’Connor and DeMartino (2006) and Story et al. (2011) clearly identify these two capabilities as keys to radical innovation success in the *industrial* context, these two concepts have remained descriptive, and there has been a lack of research sought to further develop and elaborate these capability constructs by examining their lower-order dimensions, and first-order latent factors. Of particular importance is the incubation phase. O’Connor and DeMartino (2006) state that teams are found to struggle with many technical and market uncertainties during the incubation stage. The majority of radical innovators lack a mature incubation capability, and thus *incubation appears to be the most fragile and least understood of the project management capabilities.*

**Opening the black-box of the phenomenon (longitudinal evidence)**

The longitudinal research design has provided a high level of explanation, opening the black-box of the phenomenon by determining the causal links involved in the processes, and examining previously unexplored relationships (propositions \( P_1, P_{2A}, P_{2B}, P_3, \) and \( P_4 \)). For example, Lane *et al.* (2006) have called for examining the relationship between potential absorptive capacity and radical innovation, Salomo, *et al.* (2007) have called for examining the intervening variables, linking the early phases of radical innovation development to performance, and Veryzer (1998) has called for examining the relationship between acceleration and performance.
Extending dynamic theories of competition (low level of theoretical contribution)

The conceptualization of the success/performance assessment (TCA, SCA, superior long-term financial performance, and imitation barriers) represents a low level of theoretical contribution, as LIJI incorporates dynamic theories of competition previously developed in the fields of marketing and strategic management, though are widely neglected in innovation research. When doing so, I have extended these theories of competition by theoretically adapting and empirically examining these constructs to suit the nature of RI in the (financial) service context.

Consequently, the multi-layer conceptual framework (especially LI and LII) do not only provide better understanding for one of the least studied topics (radical service innovation capabilities and competences), but also provide a rich basis for further theory development in this topic. In other words, the conceptual framework has introduced original relationships and constructs, serving as the foundation for a theory of radical innovation in the research context.

A revelatory cast study

The process model for radical service innovation management (3 phases, 23 steps) is believed to represent a theoretical contribution the service innovation literature. Taking into consideration the paucity of such process models, the case study is conceived as “revelatory cast study” (in the terminology of Yin (2009: 48)). This process model provides better understanding for the nature of the innovation process; how and why innovation emerges, develops, grows, and (perhaps) terminate. This process model also contributes to the transportation literature. The process model was based on the documentation of a radical innovation on the national level, the National Program for Vehicle Replacement (NPVR). This program is seen as a success story in a developing country, and is getting more international attention. Thus, the process model brings a success story to the academic literature, with all of its innovations (e.g., PPP innovation and the concept of one-stop shop), crises (e.g., the ad crisis), and setbacks (e.g., the limited supply of scrapping and storage site).

Identifying thirteen criticisms of the VRIO framework

The current research project has extended a typology of the resource-based views of the firm previously introduced (Makadok, 2001; Seoudi, 2009) to structure these views into two recognizable schools of thought (the RBV, also known as the VRIO Framework;
and the competence-based view of the firm). Moreover, it identifies *thirteen criticisms of the VRIO framework*, one of the most widely invoked theories in the entrepreneurship and strategic management literature (Newbert, 2007; Priem and Butler, 2001a). Thus, this structure and critique would help researchers work through the wide terminological confusion, situate their work within the relevant school of thought, and also would encourage them to move beyond the narrow focus of the RBV.

### 11.4.2 Methodological Contribution

Longitudinal research based on process data has valuable advantages. Despite this, it is one of the least employed methodology in the social science, in general, and studies of organizational change, innovation, and entrepreneurship, in particular (Tsoukas and Chia, 2002; Van de Ven, 2007; Van de Ven and Poole, 2005). One reason cited for such a lack of acceptance is that methods for examining how phenomena develop over time are far less well developed than those for conducting variance research. Therefore, longitudinal research based on process data remains an evolving methodology. As a consequence, researchers undertaking process research have been developing their own methods through “trial-and-error” (Langley, 1999; Van de Ven, 2007; Van de Ven and Huber, 1990: 215; Wolfe, 1994: 411-412).

While I have elaborated on one common framework of data analysis (narrative strategy then synthetic strategy) previously suggested by Langley (1999), I believe that I have extended this common framework in three main ways. **First**, her common framework of data analysis enables researchers to develop first-order constructs, not superordinate or theoretical (higher-order) constructs. Thus, I have to incorporate several qualitative tactics (factoring and partitioning (Miles and Huberman, 1994)) into this common framework to be able to achieve the research objective. **Second**, she does not show how the pr-developed conceptual framework could serve the analysis process. In fact, most of the process research undertaken has employed the grounded theory strategy. However, I have employed the case study strategy, in which developing theoretical propositions before starting the empirical investigation is an essential theme (Yin, 2009). This, however, required proposing these theoretical constructs. This preconception was a very difficult task, due to the lack of longitudinal research on the key capabilities and competences of radical innovation success in general. Thus, I had to incorporate another tool (thought experiments or trails) when proposing an analytical
conceptual framework. Therefore, by bundling a set of tools and tactics related to conceptual development and process data analysis in one study, and by documenting the methodology employed, and discussing and justifying all the methodological decisions, the current research reinforces the use of a longitudinal qualitative method in building theory from process data. This would encourage qualitative researchers to employ this methodology, and benefit from its invaluable advantages.

11.4.3 Practical Contribution and Policy Implications

The failure rate of these costly and complex innovation initiatives is high and incremental innovation and imitation behaviour dominates most service industries, especially the financial service industry. Therefore, the process model for radical service innovation developed, and the multi-layer conceptual framework concluded will provide practitioners with deeper knowledge and understanding with regard to such strategic organizational practice. More specifically, the key findings are expected to contribute to practice in several ways.

A road map for innovation and marketing managers

The process model (3 phases, 23 steps) is expected to guide the innovation and marketing managers when developing and implementing radical service innovation as the journey of innovation project unfolds. As stated by Van de Ven and Poole (1990), these process models provide a road map, opening the proverbial black box of one of the most complex organizational practices. In this respect, it is believed that the process model developed is comprehensive when compared to other process models introduced by past research (e.g., the model developed by Veryzer (1998) includes 7 steps).

A valuable tool for mapping radical innovation capabilities and competences

The theoretical constructs of layers I and II (LI and LII) of the conceptual framework are presented in terms of capabilities and competences, which are conceptualized as theoretical (higher-order) constructs, manifested by a comprehensive set of first-order latent factors. Thus, these two layers provide a valuable tool when mapping the radical innovation related capabilities and competences. Organizational engineers need such a map when building, configuring and bundling, analyzing, assessing, and maintaining these valuable resources. This is particularly valuable as organizations “frequently” neither know what strategic resources and capabilities they have, nor which strategic
resources and capabilities are key to the success of this complex organizational practice (Klein and Hiscocks, 1994). The situation is much worse in the financial services industry in which incremental innovation and imitation behavior dominate (Morris and Westbrook, 1996; Salunke, et al., 2011), and the radical innovation capabilities and competences are lacking. Moreover, as the first-order latent factors of each capability represents a system, and a set of capabilities are found to be complementary (interconnected and mutually reinforce each other), such mapping would make these capabilities and competences more visible (Hamel, 1994), and would prevent “blind spots” when accumulating new resources and capabilities (Van der Vorst, 1997: 254). That is, for example, to consider some dimensions in the Core RIC, and neglect their complementary dimensions (as was evident in the case studies).

**Bringing dynamic theories of competition to the service development community**

Regarding the performance assessment (LIII), past research has tended to neglect dynamic theories of competition when assessing success, and has tended to develop new measures for the performance of the innovation activity. However, as argued by Griffin and Page (1996) and Gatignon, et al. (2002), the proliferation of these concepts and measures has caused confusion. Moreover, the product/service development community needs to bring some order to the variety and disorder of measures in practice success/failure research. Furthermore, LIII takes into consideration the set of imitation barriers that the radical innovator need to sustain the TCA generated by the innovation. These imitation barriers have been ignored by past innovation research.

In short, the key findings are expected to help practitioners to: make the course of accumulating radical innovation capabilities and competences more informed and effective; make the course of managing these high-risk ventures shorter, less circuitous, less expensive, and more certain; and generate SCA and superior long-term performance from these strategic activities.

From **policy perspective**, there are a number of implications for policy makers. **First**, radical innovation has significant national benefits such as creating new industries. Thus, the public sector should support these emerging industries by, for example, supporting the private entities newly developed to fill in positions within these industries. **Second**, the findings show that governmental bodies may be actively involved in not only the development of radical innovations, but also filling positions
within the newly created business model, whenever these positions cannot be filled by private entities (de Vries, 2006; Story, et al., 2011). Regarding the former, the conceptual framework will provide these bodies with deeper knowledge and understanding with regard to the nature of the radical innovation project they will be involved in. Regarding the latter, the findings suggest that these governmental bodies must not follow a mellow role. Third, these governmental bodies need to take into consideration the impact of their decisions in the further development of these industries, particularly if they play major role in the newly created business model. Fourth, international bodies play invaluable roles in the radical innovation initiatives in the developing countries. Such roles, however, would be further enhanced by establishing strategic relationships with these international bodies to increase the mutual absorptive capacity. In this respect, the governmental bodies could significantly facilitate the establishment of these relationships by, for example, initiating dialogues between the relevant international bodies and the private sector that promote knowledge transfer and collaboration.

Finally, the current research has also important implication for the policy makers in the developing countries interested in the Egyptian NPVR. The new-to-the world PoAs methodology and the program scheme developed (based on PPP business model) are getting more attention from the countries in which old vehicles represent a great challenge. In this context, most of the published literature about the NPVR has emphasized on the technical aspects of the program (e.g., the PoAs methodology), and the environmental benefits. However, many of the steps of the process model developed, in addition to the associated issues, setbacks and crises, and lessons learnt are left undocumented. Thus, documenting this case study would facilitate transferring the successful practice. This is of particular importance as “developing countries and countries in transition represent between 85% and 90% of the world’s population and face unique public transport challenges that are not necessarily present in developed countries” (Finn and Walters, 2010).

11.5 Limitations and Future Research

Several limitations are recognized in the current research projects. The time frame, limited financial resources, and the political situation in Egypt during the field study all represented constraints on my ability to mitigate these limitations. The first limitation is
related to proposition 1. Opening the proverbial black box between the entrepreneurial (resource building) capability and Core RIC requires observing the mechanisms (processes) by which entrepreneurial executives built all the second-order dimensions underlying the Core RIC. This was not the case. The managerial systems construct is a case in point. The second limitation is related to the conceptualization of the project management capabilities (incubation and acceleration). These capabilities were concluded based on a single radical innovation project (the NPVR). Although these theoretical constructs were initially created from the literature, and significantly enriched by the single-case embedded design, the conceptualization would be augmented if other radical innovation projects were included. The third limitation is related to the number of (private and public) actors involved in the case study, and the key informants interviewed. Due to the large number of actors involved in this national program, I decided to interview informants and collect documents from the key actors only. However, involving more actors and informants would bring valuable insights into the conceptual framework.

Regarding future research, theory building in the social sciences may follow a “growth cycle”, including five phases: (1) conceptual development; (2) operationalization; (3) confirmation or disconfirmation; (4) application; and (5) continuous refinement and development (Eisenhardt and Graebner, 2007; Lynham, 2002: 229). The central aim of this thesis was to initiate a theory through the creation of theoretical constructs, and the development of the causal relationships among these constructs (propositions). Thus, developing measures (operationalization) for the first-order latent factors underlying these constructs was beyond the scope of the current research. Therefore the next step should be to further develop and validate these theoretical constructs. That is the appropriate measurement items of the first-order factors should be derived from past (theoretical and empirical) research, and the multidimensional constructs should be validated through large scale surveys, and using the confirmatory factor analysis. By doing so, future research has the potential to make a significant contribution to the newly created theoretical constructs.

The following phase is to formally test the propositions linking the theoretical constructs. Confirmation is essential to confer a trust upon the explanation provided by this framework. Path analysis model (and Structural Equation Modelling for longitudinal data) could be used to provide a more rigorous test for the linkages among
these constructs (e.g., Bijleveld and Kamp, 1998: 207-268; Bryk et al., 2004: 127). Case study research could also be used to “test” the research propositions. For example, Yin (2009: 54) suggests employing a multiple-case design in which few cases (“2 or 3”) are “carefully selected” so that each case predicts “similar results” (“a literal replication”). Yin (2009: 149-156) also suggests the use of the conceptual framework (the “firm- or organizational-level logic model” in his terminology) as a form of “pattern matching” (an analytic technique). This implies matching the empirically observed cause-effect-cause-effect patterns to the propositions developed in the current research. In this respect, the research propositions will find a compelling support if all cases turn out as predicted. If the cases are in some way contradictory, the propositions must be revised and retested with another set of cases.

Finally, scholars are strongly recommended to adopt the characteristics-based approach when conceptualizing the degree of innovativeness in their surveys (Drejer, 2004). As argued in Chapter 3, this approach has the ability to overcome the issues (ambiguity, misclassification of the degree of innovativeness, and inconsistency) found in previous conceptual and empirical research in innovation typologies.

11.6 Final Thought

There is a debate with regard to the ability of large mature firms to produce and implement radical innovations. Some argue, based on anecdotal evidence, that large mature firms lack the ability to incubate and accelerate. Thus, they should be “fast-second”, directly before the appearance of dominant design (Markides and Geroski, 2005). Others argue that they can and have to accumulate both capabilities, but they need to follow some form of ambidexterity (O'Reilly III and Tushman, 2004). In other words, developing and implementing radical innovation within established firms is next to impossible. The others argue that they can and need to produce radical innovation internally as few radical innovation projects fit the ambidexterity suggestion. In this case, they need to develop project management capabilities (O'Connor and DeMartino, 2006; Story, et al., 2011). They need also to develop “core capabilities” (Leonard-Barton, 1992) or “core competence” (Prahalad and Hamel, 1990).

The current research has sought to holistically and longitudinally investigate the ability of large mature banks to periodically produce radical innovations. Based on the key
findings, the current research joins and extends the argument of the third camp. That is large mature firms can produce radical innovation internally. Though, they need to accumulate a chain of linked capabilities and competences: entrepreneurial (resource building) capability; Core RIC; incubation capability; and superior acceleration capability. They also need to learn how to sustain the competitive advantage established by the superior acceleration capability. That is why a multi-layer conceptual framework was essential.
References


EEAA. (2008c). Memorandum to be presented to Mr. Prof. Dr. Prime Minister (Vol. Internal Document, pp. 1-7). Cairo: Egyptian Environmental Affairs Agency (EEAA).


References


References


Minister of Finance. (2009, March 05). With the participation of 3 banks and 5 auto manufacturers: The project of replacing 34,000 taxi vehicles will start next Sunday. Retrieved on March 03, 2011 from the Ministry of Finance (MOF) <http://www.mof.gov.eg/Arabic/MOFNews/Media/Pages/relea5-3-09.aspx>.


References


Appendices
### Appendix A.1 Photos

<table>
<thead>
<tr>
<th>Photo 2.1: The chaotic and undisciplined traffic</th>
<th>Photo 2.2: The Cairo City</th>
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</thead>
<tbody>
<tr>
<td><img src="image1" alt="Photo 2.1" /></td>
<td><img src="image2" alt="Photo 2.2" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo 2.3: The Giza City (The Pyramids)</th>
<th>Photo 2.4: A yellow cab</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Photo 2.3" /></td>
<td><img src="image4" alt="Photo 2.4" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo 2.5: City-centre rank for yellow cabs</th>
<th>Photo 2.6: An old Fiat taxi</th>
</tr>
</thead>
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<tr>
<td><img src="image5" alt="Photo 2.5" /></td>
<td><img src="image6" alt="Photo 2.6" /></td>
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### Appendix A.1 Photos

<table>
<thead>
<tr>
<th>Photo 2.7: A microbus</th>
<th>Photo 2.8: Poor technical conditions</th>
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<td><img src="image1" alt="Photo 2.7" /></td>
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<table>
<thead>
<tr>
<th>Photo 2.9: On-street taxi maintenance</th>
<th>Photo 2.10: Old taxis frequently breakdown</th>
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<tr>
<th>Photo 2.11: Meters are fitted but not used</th>
<th>Photo 2.12: Scrapped vehicles</th>
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</thead>
<tbody>
<tr>
<td><img src="image5" alt="Photo 2.11" /></td>
<td><img src="image6" alt="Photo 2.12" /></td>
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### Appendix A.1 Photos

<table>
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<tr>
<th>Photo</th>
<th>Description</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>Photo 2.13</td>
<td>New vehicle parking lot</td>
<td>Google Images (scrapping site + taxi replacement project).</td>
</tr>
<tr>
<td>Photo 2.14</td>
<td>New vehicle inspection</td>
<td>Google Images (scrapping site + taxi replacement project).</td>
</tr>
<tr>
<td>Photo 2.15</td>
<td>Advertising on new vehicle</td>
<td>Google Images (scrapping site + taxi replacement project).</td>
</tr>
<tr>
<td>Photo 8.1</td>
<td>The Dogan Sahin 1.4</td>
<td>Kfw-Entwicklungsbank (2008).</td>
</tr>
<tr>
<td>Photo 8.2</td>
<td>The interior of Dogan Sahin</td>
<td>Kfw-Entwicklungsbank (2008).</td>
</tr>
</tbody>
</table>
## Appendix A.1 Photos

<table>
<thead>
<tr>
<th>Photo 8.3: The CNG fuel cylinder in the boot of a vehicle</th>
<th>Photo 8.4: The suggested white taxi vehicle with white and black sticker</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="CNG fuel cylinder in the boot of a vehicle" /></td>
<td><img src="image2.jpg" alt="Suggested white taxi vehicle" /></td>
</tr>
</tbody>
</table>

| Photo 8.5: An ad of the new product |  |
|------------------------------------|  |
| ![An ad of the new product](image3.jpg) |  |
| Source of photo: bank A. |  |
## Appendix A.2 A Stylized Owner Spreadsheet Model

Table A.2.1: The NPV of Petrol Model Purchased with Loan (n = 5 years)

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<th>5</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down-payment</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
<td>From ad agency</td>
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<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
</tr>
<tr>
<td>Resale value at the end</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10,500</td>
</tr>
<tr>
<td><strong>Total income</strong></td>
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<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>79,080</td>
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</tr>
<tr>
<td><strong>Cost</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
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<td>10,668</td>
<td>10,986</td>
<td>11,324</td>
<td></td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
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<td>7,493</td>
<td>7,967</td>
<td>8,336</td>
<td>12,232</td>
<td></td>
</tr>
<tr>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<tr>
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<tr>
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<tr>
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<td></td>
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<td><strong>Total cost</strong></td>
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Source: Self.
### Table A.2.2: The NPV of Petrol Model Purchased with Loan ($n = 6$ years)

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<tr>
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</tr>
<tr>
<td>Permits</td>
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<tr>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
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<td>65,520</td>
<td>65,520</td>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<td><strong>NPV (11.5% discount rate)</strong></td>
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Source: Self.
Table A.2.3: The NPV of Petrol Model Purchased with Loan ($n = 7$ years)

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</tr>
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</tr>
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<td></td>
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<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
<td>From ad agency</td>
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<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
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<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
<td>74,880</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
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<td>10,459</td>
<td>10,668</td>
<td>10,868</td>
<td>11,324</td>
<td>11,671</td>
<td>12,015</td>
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</tr>
<tr>
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<td>4,870</td>
<td>7,495</td>
<td>7,967</td>
<td>8,336</td>
<td>12,232</td>
<td>7,623</td>
<td>14,908</td>
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</tr>
<tr>
<td>Direct labor</td>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
</tr>
<tr>
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<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
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</tr>
<tr>
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<td>9,672</td>
<td>9,672</td>
<td>9,672</td>
<td>9,672</td>
<td>9,672</td>
<td>9,672</td>
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</tr>
<tr>
<td>Purchase price at the end</td>
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<td></td>
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<td>14,786</td>
<td>11,052</td>
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</table>

Source: Self.
Table A.2.4: The NPV of CNG Model Purchased with Loan ($n = 5$ years)

<table>
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<th>Year</th>
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<tbody>
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<td><strong>Net Initial Cost</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
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<td></td>
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<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
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<td>3,060</td>
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<td>68,580</td>
<td>68,580</td>
<td>79,830</td>
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<td><strong>Cost</strong></td>
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<tr>
<td>Fuel cost</td>
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<td>2,342</td>
<td>2,364</td>
<td>2,390</td>
<td>2,390</td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
<td>4,870</td>
<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
<td>12,232</td>
</tr>
<tr>
<td>Direct labor</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
</tr>
<tr>
<td>Permits</td>
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<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
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<td>12,456</td>
<td>12,456</td>
<td>12,456</td>
<td>12,456</td>
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<tr>
<td>Purchase price at the end</td>
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<td>47,956</td>
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<td>21,987</td>
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<td>20,624</td>
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</tbody>
</table>

Source: Self.
Table A.2.5: The NPV of CNG Model Purchased with Loan ($n = 6$ years)

<table>
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<tr>
<th>Year</th>
<th>CNG Model, Loan ($n = 6$)</th>
<th>Net Initial Cost</th>
<th>Income</th>
<th>Cost</th>
<th>Net Cash Flow (NCF)</th>
<th>NPV (11.5% discount rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Net initial cost</td>
<td>Operating income</td>
<td>Fuel cost</td>
<td>Maintenance &amp; repairs</td>
<td>Direct labor</td>
</tr>
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<td>0</td>
<td>1,500</td>
<td>65,520</td>
<td>2,342</td>
<td>4,870</td>
<td>22,800</td>
</tr>
<tr>
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<td>1</td>
<td>65,520</td>
<td>65,520</td>
<td>2,342</td>
<td>7,495</td>
<td>22,800</td>
</tr>
<tr>
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<td>2</td>
<td>65,520</td>
<td>65,520</td>
<td>2,342</td>
<td>7,967</td>
<td>22,800</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>65,520</td>
<td>65,520</td>
<td>2,364</td>
<td>8,836</td>
<td>22,800</td>
</tr>
<tr>
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<td>12,232</td>
<td>22,800</td>
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<td>65,520</td>
<td>2,412</td>
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<td>22,800</td>
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<td>2,412</td>
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Source: Self.
### Table A.2.6: The NPV of CNG Model Purchased with Loan \((n = 7\) years)

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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down payment</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
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<td></td>
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<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
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<td>3,060</td>
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<tr>
<td>Resale value at the end</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Total income</strong></td>
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<td>68,580</td>
<td>68,580</td>
<td>68,580</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
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<td>2,342</td>
<td>2,342</td>
<td>2,342</td>
<td>2,364</td>
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<td>2,437</td>
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<td>7,987</td>
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<td>12,232</td>
<td>7,623</td>
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<td>14,908</td>
</tr>
<tr>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
</tr>
<tr>
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<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
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<td>10,440</td>
</tr>
<tr>
<td>Purchase price at the end</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
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<td>44,775</td>
<td>120,483</td>
<td>120,483</td>
</tr>
<tr>
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<td>22,640</td>
<td>19,218</td>
<td>23,805</td>
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</tr>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Source: Self.
Table A.2.7: The NPV of Petrol Model Purchased with Cash ($n = 5$ Years)

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<th>Year</th>
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<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Initial Cost</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net price</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
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<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
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<td></td>
</tr>
<tr>
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<td>68,580</td>
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<td>68,580</td>
<td>79,080</td>
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<td>Cost</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
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<td>10,459</td>
<td>10,666</td>
<td>10,986</td>
<td>11,324</td>
<td></td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
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<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<td>1,500</td>
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<td>24,453</td>
<td>23,363</td>
<td>30,973</td>
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<td>21,328.16</td>
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</tbody>
</table>

Source: Self.
### Table A.2.8: The NPV of Petrol Model Purchased with Cash ($n = 6$ Years)

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<th>Petrol Model, Cash ($n = 6$)</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Initial Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net price</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
<td></td>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net initial cost</td>
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<td>38,500</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
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<td></td>
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<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
<td>3,060</td>
</tr>
<tr>
<td>Resale value at the end</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7,980</td>
</tr>
<tr>
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<td>68,580</td>
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<td>68,580</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
<td></td>
<td>10,254</td>
<td>10,459</td>
<td>10,668</td>
<td>10,986</td>
<td>11,324</td>
<td>11,671</td>
<td>11,671</td>
</tr>
<tr>
<td>Maintenance &amp; repairs</td>
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<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
<td>7,623</td>
<td>7,623</td>
</tr>
<tr>
<td>Direct labor</td>
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<td>22,800</td>
<td>22,800</td>
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<td>107,739</td>
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<td>25,037</td>
<td>24,453</td>
<td>23,363</td>
<td>19,726</td>
<td>-31,179</td>
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Source: Self.
# Appendix A.2 The Spreadsheet Model

## Table A.2.9: The NPV of Petrol Model Purchased with Cash ($n = 7$ Years)

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<th>5</th>
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</tr>
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<td>65,520</td>
<td>65,520</td>
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</tr>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<td>44,127</td>
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<td>44,495</td>
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</tr>
<tr>
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<td>38,500</td>
<td>27,770</td>
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<td>24,453</td>
<td>23,363</td>
<td>19,726</td>
<td>24,085</td>
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Source: Self.

NPV (11.5% discount rate) 43,475.04
### Table A.2.10: The NPV of CNG Model Purchased with Cash ($n = 5$ Years)

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<th>CNG Model, Cash ($n = 5$)</th>
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<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>65,520</td>
<td>65,520</td>
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<td>68,830</td>
<td>68,830</td>
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<td>2,342</td>
<td>2,342</td>
<td>2,342</td>
<td>2,342</td>
</tr>
<tr>
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<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
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<tr>
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<td>1,500</td>
</tr>
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<td>1,069</td>
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<tr>
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<td>36,673</td>
<td>104,555</td>
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<tr>
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<td>31,907</td>
<td>24,725</td>
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Source: Self.
Table A.2.11: The NPV of CNG Model Purchased with Cash ($n = 6$ Years)

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<td></td>
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<td></td>
</tr>
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</tr>
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<td>65,520</td>
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</tr>
<tr>
<td>Fuel cost</td>
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<td>2,342</td>
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<td>2,390</td>
<td>2,412</td>
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</tr>
<tr>
<td>Maintenance &amp; repairs</td>
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<td>4,870</td>
<td>7,495</td>
<td>7,967</td>
<td>8,836</td>
<td>12,232</td>
<td>7,623</td>
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</tr>
<tr>
<td>Direct labor</td>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<td>1,500</td>
<td>1,500</td>
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<tr>
<td>Insurance premiums</td>
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<td>1,069</td>
<td>965</td>
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<td>39,991</td>
<td>101,781</td>
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<td>32,694</td>
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Source: Self.
### Table A.2.12: The NPV of CNG Model Purchased with Cash ($n = 7$ Years)

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<td><strong>Income</strong></td>
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<td></td>
</tr>
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<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
<td>65,520</td>
</tr>
<tr>
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<td>68,580</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fuel cost</td>
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<td>2,342</td>
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<td>2,390</td>
<td>2,412</td>
<td>2,437</td>
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</tr>
<tr>
<td>Maintenance &amp; repairs</td>
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<td>7,967</td>
<td>8,335</td>
<td>12,232</td>
<td>7,623</td>
<td>14,908</td>
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<td></td>
</tr>
<tr>
<td>Direct labor</td>
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<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
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<td>1,500</td>
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</tr>
<tr>
<td>Insurance premiums</td>
<td>1,485</td>
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<td>1,173</td>
<td>1,069</td>
<td>965</td>
<td>861</td>
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<td></td>
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</tr>
<tr>
<td><strong>Total cost</strong></td>
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<td>35,886</td>
<td>36,673</td>
<td>39,991</td>
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<td>110,904</td>
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</tr>
<tr>
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<td>32,694</td>
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Source: Self.
## Appendix A.3 The Interview Descriptive Coding

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<th>Interviewee</th>
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<tbody>
<tr>
<td>Bank A (The radical innovator)</td>
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<tr>
<td>1 Executive (Board Member)</td>
<td>A, Sen₁</td>
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<tr>
<td>2 General Manager (SMEs)</td>
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<tr>
<td>5 Manager (GDT)</td>
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<td>Marketing &amp; Development</td>
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<tr>
<td>6 The Gas Connection Manager</td>
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<td>Credit &amp; Marketing</td>
</tr>
<tr>
<td>7 The Auto Finance Manager</td>
<td>A, Mid₂</td>
<td>Credit &amp; Marketing</td>
</tr>
<tr>
<td>8 Team Member 1 (GDT)</td>
<td>A, TM₁</td>
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</tr>
<tr>
<td>9 Team Member 2 (GDT)</td>
<td>A, TM₂</td>
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<tr>
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</tr>
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<td>Bank C</td>
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<td>Bank Z (The creative imitator)</td>
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<td>Z, Sen₂</td>
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</tr>
<tr>
<td>3 Used auto dealers (3 dealers)</td>
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<tr>
<td>EEAA</td>
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<td></td>
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<tr>
<td>1 Deputy Director (Program Manager)</td>
<td>EEAA; Sen₁</td>
<td>Cleaner Production</td>
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<td>2 Team Member</td>
<td>EEAA; TM₁</td>
<td>Technical Specialist</td>
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<tr>
<td>3 Team Member</td>
<td>EEAA; TM₂</td>
<td>Air and Noise Quality Specialist</td>
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<td>1 The Taxi Replacement Program Supervisor</td>
<td>MOF; Sen₁</td>
<td>Economic Expert and Consultant</td>
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<td>Taxi Owners/Drivers</td>
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Appendix A.3 The Interview Descriptive Coding

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<tr>
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Source: Self.
Appendix A.4 Case Study Questions (English Version)

Case Study Questions

Radical Service Innovation Capabilities and Competences and its Performance Measurement in the Egyptian Banking Sector
Thank you for being willing to take part in this case study. Can I first of all assure you that you will remain completely anonymous and no records of the interview will be kept with your name on them. With your permission, tape recorder will be used during the interview.

Most of the following cards are codified into the conceptual framework we briefly discussed in the previous interview. I would like to investigate your retrospective experience regarding all the identified cards. By helping me in answering all the questions in these cards in details, you will significantly contribute to the data analysis, research findings, and as such the dynamic conceptual framework being built.

Yours Sincerely,

Tarek El Shafeey
PhD Student
Human Resource and Marketing Management
Portsmouth Business School
University of Portsmouth
United Kingdom
E-mail: hrm70196@port.ac.uk
Tel (mobile): 002 012 3511 372
General Questions

General questions about the totally new product and innovation project:

1. What are the criteria used to classify financial products into: corporate, SMEs, microfinance, and retail?
2. To which category (of the previous four categories) the totally new product belongs to?
3. What are the market needs (issues) which the totally new product satisfies (solves)?
4. What is the core-supplementary combination of solutions which the totally new product produces?
5. Does the new product require all of the following:
   A- New knowledge and skills to be accumulated by the potential customer?
   B- New (front- and back office) operations and technologies to be developed?
   C- New knowledge and skills to be accumulated by the staff participating in the service production and delivery?
6. Can you briefly mention to the major stages and steps followed when developing the totally new product/service?
7. What are the key (internal and external) actors involved in the development of the totally new product?
8. What are the key (internal and external) actors involved in the production of the totally new product?

Card 1: R&D Capability

9. Which of the following actors is responsible for undertaking the research activity, leading to the generation of totally new product ideas:
   A- Internal actor (e.g., research department, marketing department, technical department)?
   B- External actor (e.g., specialized firm, supplier)?
   C- Collaboration?
10. Totally new product ideas may come from:
    A- Customers?
    B- Marketing?
    C- R&D?
    D- IT?
    E- Several places within the institution (e.g., executives, communities-of-practice)?
    F- Suppliers?
11. Which of the following structures is adopted when developing totally new product:
    A- Informal teamwork (e.g., communities-of-practice)?
    B- Cross-functional team?
    C- A teamwork within a specific department (e.g., marketing, R&D)?
12. How the (development) team capability could be accumulated?
13. How the (development) team capability could be sustained?
14. Has the development team participated in some development projects under the same innovation trajectory before the participation of the radical innovation project?
15. What are the characteristics of the development team members?
16. How can you describe the process by which appreciable elements of knowledge (required to generate totally new ideas and concepts) created:
   A- It requires high quality shared time and space (e.g., to permit dialog, discussion, observation)?
   B- It requires conflict and disagreement (creative chaos)?
   C- It requires ambiguity?
17. Anything more?

Card 2: Technological (IT) Capability
18. What are the roles of CORE banking application in the innovation activity?
19. What are the roles of other software (as enabler) in the innovation activity?
20. What are the roles of IT expertise in the innovation activity?
21. How does the IT infrastructure sustain the innovation activity?
22. How the technological capability could be accumulated?
23. How the technological capability could be sustained?
24. Anything more?

Card 3: Cooperative (Networking) Capability
25. Does the establishment of strategic relationship with germane suppliers and partners enhance the radical innovation competence of your institution? If yes, what are the benefits could be gained from these strategic resources (relationships)?
26. Before the official initiation of the focal radical innovation project, has your institution collaborated with these suppliers and partners in some development projects? If yes,
   A- Give examples of some successful development projects.
   B- Give examples of some unsuccessful development projects.
   C- What were the reasons of such failure?
27. Anything more?

Card 4: Managerial Systems
28. The HR systems may be identified as one component of the innovation competence of the radical innovator.
A- What are the roles played by these HR systems in stimulating, encouraging, and sustaining the radical innovation related activities in your institution?
B- How the entrepreneurial individuals could be identified and recruited?
C- How their innovation capabilities could be nurtured and sustained?
D- How these competence carriers are promoted and retained?
29. Anything more?

Card 5: Innovation-friendly Culture

30. An innovation-friendly culture (values and norms) may be identified as another component of the innovation competence of the radical innovator. What are the dimensions of such components required to stimulate, encourage, support, and sustain the radical innovation related activities in your institution?
A- Values and norms related to sharing knowledge with individuals in other functions and organizational levels.
B- Values and norms related to providing support to individuals in other functions and organizational levels.
C- Values and norms related to taking risk by other functions and organizational levels participated in the radical innovation project?
D- Values and norms related to accepting change by other functions and organizational levels affected by the change usually associating radical innovations.
31. How such dimensions could be shaped to make radical innovation more natural, accepted, and valued activity?
32. Anything more?

Card 6: The Complementarities among the Resources and Capabilities

33. The complementarity (interconnectedness) among the five resources and capabilities:
A- The R&D-IT complementarity;
B- The R&D/IT-Cooperation complementarity;
C- R&D-Managerial Systems complementarity;
D- IT/Cooperation-Managerial Systems complementarity;
E- R&D/IT/Cooperation-Culture complementarity;

Card 7: Entrepreneurial (Resource Building) Capability

34. How the top management team constructs all (or at least the critical) dimension within the previous five strategic resources and capabilities?
A- Executives as capability patrons;
B- Executives as project champions (any project undertaken before the official
initiation of radical innovation);
C- Executives as the shapers of culture;
D- Causal understanding when constructing this complex bundle of strategic
resources and capabilities.

35. What are the characteristics of such organizational engineers?
36. Executives are sometimes called causal actors, because they are responsible for
constructing organizational capabilities. Is there any rival explanation?
37. Anything more?

Card 8: The Direction Phase of the Radical Innovation Project

38. Describe the nature of the first phase of the radical innovation project: the temporal
ordering of events and processes that unfold during the direction phase.
A- Setting objectives: What are the general market (and technical) issues based on
which these objective are set?
B- What is the mechanism by which the breakthrough idea generated (e.g., the
simultaneous enactment of the three modes of knowledge to produce solution
for the general issues, or starting with ad hoc solution followed by pilot
projects)?
C- What is the mechanism used to recognize the potential of the opportunity (e.g.,
research, chain of reaction within the radical innovator or among partners)?
D- What are the roles played by international bodies in the direction phase?
E- In terms of the characteristics-based approach of innovation, why the
breakthrough idea has an evolutionary nature (remember the technological and
marketing S-curves)?
39. Any crises or setbacks during this phase?
40. Anything more?

Card 9: The Incubation Phase of the Radical Innovation Project

41. Describe the nature of the second phase of the radical innovation project: the
temporal ordering of events and processes that unfold during the incubation phase.
A- Any stage should be started by a set of objectives. What is the difference
between the objectives set at the start of the direction phase and the ones set at
the start of the incubation phase?
B- What is the nature of the incubation phase (e.g., uncertainty and learning)? Does
this require specific preparation for the team participated in the pilot project?
C- Why studying similar international experiences is considered as a good start?
D- How the service concept (satisfying the market needs) is created? What are the main components of this concept? What are the internal and external actors participated? What are the criteria based on which these external actors are joined in this step?

E- How the whole workflow is designed and integrated?

F- Before taking a decision to continuo (going live-to-probe and learn), the business implication should be analyzed, a project memo should be built, and the top management team should authorize the pilot project. What are the components of the business case? What are the characteristics of this case? How a business case related to totally new product is evaluated by the top management team?

G- Launch and review (going live-to-probe and learn) is found to be the core of the pilot project. What are the benefits? How to maximize learning during this step?

H- What are the main benefits of the way forward proposals?

I- Why the business model built is described as purely tailored?

42. What are the benefits, strengths, weakness, and threats mentioned in the way forward proposals?

43. What is meant exactly by building the ship concept underling the business model built?

44. What is the portfolio of coordination mechanisms followed by the key actors participated in the incubation stage?

45. Why the radical innovation has an evolutionary nature?

46. What are the roles played by international bodies in the incubation phase?

47. Two debates I would like to discuss:
   A- Pilot project vs. concept testing.
   B- Schumpeter Mark I vs. Schumpeter Mark II.

48. Anything more?

Card 10: The Acceleration Phase of the Radical Innovation Project

49. Describe the nature of the third phase of the radical innovation project: the temporal ordering of events and processes that unfold during the acceleration phase.
   A- How the right home (the receiving unit) is identified? When the establishment of new strategic business unit to receive the innovation would be considered?
   B- What are the champions assigned to this phase (pull and push champions)?
   C- Is a transition team formed to transit the innovation from the incubation phase to the acceleration phase?
   D- Does the new team follow a formal transition plan when integrating the innovation into the current service system (e.g., assessing the transition readiness, identifying the gap, and leveraging the capability of the receiving unit)?
E- Describe the process involved in the physical implementation of innovation (e.g., how the development activity is completed, how the media campaign is designed, how the employees’ training sessions are conducted).

F- Which of the following mechanisms adopted when hunting the market niche created (when launching the product): rolling-out with fast adaptive control system (thus continuous learning); or soft launch followed by rolling-out (thus bit-by-bit learning)?

50. Any crises and setbacks during this phase?

51. Anything more?

**Card 11: The Temporary Competitive Advantage (TCA)**

52. The TCA is defined in terms of two main components: (1) the relative customer perceived value of the market offering; and (2) the relative cost of developing, producing, and delivering this market offering. These two components should be taken into consideration to be able to identify whether the capability possessor has established effectiveness (differentiation) advantage, efficiency (cost) advantage, or effectiveness-efficiency advantage.

A- What are the value propositions (benefits) produced by the totally new product (the total market entity)?

B- Does the majority of the targeted segment perceive these benefits?

C- Have any of your competitors been able to introduce a product with higher customer perceived value?

D- What are the costs of developing, producing, and delivering the total market entity?

E- Has any of your competitors been able to introduce the same values but with lower cost.

53. Is it possible to generate differentiation advantage and cost advantage at the same time? If yes, how and when?

54. Anything more?

**Card 12: The Sustainability of CA and Imitation Barriers**

55. The CA generated from the total market entity is said to be sustained when it continues to persist (exist after efforts to duplicate that advantage are ceased).

A- Is the CA generated sustained or temporary?

B- What are the imitation barriers (e.g., the complexity of the core component of knowledge underlying the totally new product, and the ability to produce incremental innovations)?

56. Anything more?
Card 13: The Superior Long-term Financial Performance

57. Which of the following (subjective and objective) measures capture the superior, long-term performance of the new product:
   A- Sales?
   B- Growth?
   C- Cross selling?
   D- Corporate social responsibility?
   E- Building the innovation routine (Leaning Effects)?
   F- Building (new) and enhancing (the current) strategic relationships?
   G- Profitability, NPV, IRR?

58. Anything more?
Thank you very much for helping me and giving up your time. Can I finally ask you if you think there is any aspect of your experience that related to the innovation related capabilities and competences, the management of radical innovation project, and/or the success/performance measurement that has not been covered in this series of interviews?

With your permission I may need to contact you asking for more details or clarification. Also, the information you have provided may not only enrich and validate the framework, but also suggest modifying some parts of this framework. In this case, I may need to contact you to conduct a follow up interview to validate any modification.

Yours Sincerely,

Tarek El Shafeeey
PhD Student
Human Resource and Marketing Management
Portsmouth Business School
University of Portsmouth
United Kingdom
E-mail: hrm70196@port.ac.uk
Tel (mobile): 002 012 3511 372
Appendix A.5 The Case Study Questions (Arabic Version)

أسئلة دراسة الحالة

الابتكار الجذري في مجال الخدمات: القدرات التنظيمية وقياس الأداء

دراسة تطبيقية على قطاع البنوك المصرية
أود أن أشكر سيداتكم على الموافقة على الاشتراك في دراسة الحالة. يمكنني أن أؤكد لسيداتكم أنك ستحصل مجهولاً تمامًا، وأنه لن يتم الاحتفاظ بأية سجلات لهذه المقابلة الشخصية مدون عليها اسمك. أود الحصول على موافقتكم على استخدام جهاز التسجيل خلال المقابلة الشخصية.

معظم الأسئلة المذكورة في البطاقات التالية تم مناقشتها باختصار خلال استعراض الإطار المفاهيمي في المقابلة الشخصية الماضية. أود مناقشة سيداتكم في كافة بطاقات الأسئلة التالية. أود أيضًا أن أوضح لسيداتكم أن الحصول على إجابات تفصيلية لهذه الأسئلة سيؤدي بشكل كبير في عملية تحليل البيانات والوصول للنتائج مما سيكون له عظيم الأثر على بناء الإطار المفاهيمي للبحث.

وتفضلوا سيداتكم بقبول وافر الاحترام والتقدير،

طارق الشافعي
طالب دكتوراة
قسم الموارد البشرية والتسويق
كلية الإدارة، جامعة بورتسوث
المملكة المتحدة

إيميل: hrm70196@port.ac.uk
تليفون (محمول): 372 3511 012 002
أسئلة عامة حول المنتج الجديد تماماً ومشروع الابتكار:

1. ما هي المعايير المستخدمة لتصنيف المنتجات المالية إلى: صيرفة الشركات، صيرفة المشروعات الصغيرة والمتواسطة، التمويل المتناهي الصغر، صيرفة التجزئة (الأفراد)؟

2. إلى أي فئة من الفئات الأربعة السابقة ينتمي المنتج الجديد محل الدراسة؟

3. ما هي الالتحاجات السوقية (مشكلات العملاء) التي يقوم المنتج الجديد بإشباعها (بحلها)؟

4. ما هو مزيج المنافع الرئيسية والفرعية التي يقوم المنتج الجديد بتقديمها لإشباع الالتحاجات السابقة؟

5. هل يحتاج إنتاج وتقديم المنتج الجديد إلى كل ما يلي:
   - قيم العمل المحتمل باكتساب معرفة جديدة وبناء مهارات جديدة؟
   - تصميم عمليات وتكنولوجيا جديدة (كل من المكاتب الأمامية والخلفية)؟
   - قيام الأفراد المشتركين في إنتاج وتقديم الخدمة باكتساب معرفة جديدة وبناء مهارات جديدة؟

6. باختصار، ما هي المراحل الخطوات الرئيسية التي تم اتباعها عند تطوير المنتج الجديد؟

7. ما هي الجهات والإدارات الرئيسية (الداخلية والخارجية) التي اشتركت في تطوير المنتج الجديد؟

8. ما هي الجهات والإدارات الرئيسية (الداخلية والخارجية) التي اشتركت في تقديم المنتج الجديد؟

9. أي من الجهات التالية مسؤولة عن القيام بالأنشطة البحثية التي تسعي لتوليد أفكار منتجات جذرية:
   - جهات داخلية (على سبيل المثال: إدارة البحوث، إدارة التسويق، إدارات فنية)؟
   - جهات خارجية (على سبيل المثال: مكاتب بحوث مخصصة، موردين)؟

10. أفكار المنتجات الجذرية قد تأتي من:
    - العملاء؟
    - إدارة التسويق؟
- إدارة البحوث والتطوير؟
- إدارة النظم وتكنولوجيا المعلومات؟
- عدة جهات داخلية (على سبيل المثال: المديرين التنفيذيين، مجتمعات الخبرة)؟
- موردين؟

11. أي من الهياكل التالية يتم اتباعه عند تطوير منتجات جديدة تمامًا:
- فريق عمل غير رسمي (على سبيل المثال: مجتمعات الخبرة)؟
- فريق عمل مشترك (مكون من إدارتين تنظيميّة مختلفة)؟
- فريق عمل مكون من أفراد يتنمو لإدارة تنظيميّة واحدة فقط (على سبيل المثال:
- البحث والتطوير أو التسويق)؟

وجود فريق عمل للتطوير قد يصنف على أنه أحد المهارات والقدرات التنظيميّة الهاّمة.
كيف يمكن بناء هذه المهارة التنظيميّة؟
كيف يمكن دعم وحماية هذه المهارة التنظيميّة؟

13. هل أشد فريق العمل المسئول عن تطوير المنتج الجذري محل الدراسة في
مشروعات تطوير منتجات جديدة من قبل؟
ما هي خصائص أعضاء فريق التاوير؟

14. تشير أغلب الدراسات ذات الصلة إلى أن توليد أفكار منتجات جذرية يتتطلب خلق
معرفة جديدة. كيف يمكن وصف العملية التي يتم من خلالها خلق معرفة جديدة:
- تتطلب هذه العملية القيام ببعض الفريق بعقد جلسات مشتركة ذات جودة عالية
(على سبيل المثال: جلسات تتيح إجراء حوار مفتوح، مناقشة، ملاحظة طريقة
عمل باقي أعضاء الفريق)؟
- تتطلب هذه العملية بعض القدرة من الصراع والخلاف (فوضى خلاقة)؟
- تتطلب هذه العملية بعض القدرة من الغموض؟
هل تود إضافة أي شيء آخر؟

15. 16. 17. 18. 19. 20. 21. 22. بطاقة الأسئلة رقم 2: قدرات متعلقة بنظم وتكنولوجيا المعلومات

ما هي الأدوار التي يلعبها نظام ال
CORE Banking في النشاط الإبتكاري للبنك؟
هل يتم الاعتماد على أي برامج أخرى عند تطوير وتصميم منتجات جديدة؟
هل تلعب الخبرة الفنية التكنولوجيّة دور هام في عملية تطوير وتصميم منتجات جديدة؟
هل تلعب البنية التحتية التكنولوجيّة دور هام في دعم النشاط الإبتكاري للبنك؟
كيف يمكن بناء القدرات المتعلقة بنظم وتكنولوجيا المعلومات؟
بطاقة الأسئلة رقم 3: قدرات متعلقة ببناء شبكة علاقات استراتيجية مع الموردين والشركاء

هل ترى أن بناء شبكة من العلاقات الاستراتيجية مع الموردين والشركاء الملائمين يعزز من قدرة البنك على ابتكار منتجات جذبية؟ إذا كانت الإجابة نعم، ما هي المنافع التي يمكن تحقيقها من بناء شبكة علاقات استراتيجية؟

قبل بدء مشروع الإبتكار الجذري محل الدراسة، هل تعاون البنك مع هؤلاء الموردين والشركاء في أي مشاريع تطوير أخرى؟ إذا كانت الإجابة نعم:
- برجاء ذكر بعض الأمثلة لمشاريع تطوير ناجحة؟
- برجاء ذكر بعض الأمثلة لمشاريع تطوير غير ناجحة؟
- ما هي أسباب عدم نجاح هذه المشاريع السابقة؟

بطاقة الأسئلة رقم 4: الأنظمة الإدارية

يمكن اعتبار النظام الإداري على أنها أحد المكونات الهامة لقدر المنظمة المالية على تطوير منتجات جذرية.

ما هي الأدوار التي تلعبها هذه الأنظمة الإدارية في تحفيز، وتشجيع، ودعم أنشطة الإبتكار الجذري داخل المؤسسة المالية؟
- كيف يتم تحديد وتجنيد الأفراد ذوي السلوك الإبتكاري؟
- كيف يتم رعاية ودعم المهارات الإبتكارية لهؤلاء الأفراد؟
- كيف يتم تعويض وترقية والاحتفاظ بهؤلاء الأفراد؟

بطاقة الأسئلة رقم 5: ثقافة تنظيمية صديقة للإبتكار

يمكن اعتبار الثقافة التنظيمية (القيم والمعايير) على أنها أحد المكونات الهامة لقدر المنظمة المالية على تطوير منتجات جذرية. ما هي أبعاد وجوهات الثقافة التنظيمية المطلوبة لتحفيز وتشجيع ودعم أنشطة الإبتكار الجذري داخل المؤسسة المالية؟
- بنية قيم ومعايير تشجع على نسق المعرفة مع الأفراد في وظائف ومستويات إدارية أخرى.
- بنية قيم ومعايير تشجع على توفير الدعم للأفراد في وظائف ومستويات إدارية.
الجذري.

- تبني قيم ومعايير تشجع على تقبل المخاطر المصاحبة لمشروع الإبتكار الجذري.

- تبني قيم ومعايير تشجع على تقبل التغييرات التنظيمية المصاحبة لتنفيذ الإبتكار الجذري.

كيف يمكن تشكيل الأبعاد الأربعة السابقة بشكل يجعل أنشطة الإبتكار الجذري أكثر سلاسة وقيمة وتقديرًا داخل المؤسسة المالية؟

هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 6: أوجه التكامل بين القدرات الإبتكارية

- أوجه التكامل بين القدرات الإبتكارية الخمسة السابقة.

- أوجه التكامل بين القدرات الإبتكارية الخمسة السابقة وتقنية المعلومات.

- أوجه التكامل بين القدرات الإبتكارية الخمسة السابقة وتقنية المعلومات.

- أوجه التكامل بين القدرات الإبتكارية الخمسة السابقة وتقنية المعلومات.

- أوجه التكامل بين القدرات الإبتكارية الخمسة السابقة وتقنية المعلومات.

بطاقة الأسئلة رقم 7: قدرة المديرين التنفيذيين على بناء القدرات الإبتكارية الخمسة السابقة

- كيف يستطيع المديرين التنفيذيين بناء كل القدرات التنظيمية الخمسة السابقة (أو على الأقل الجوانب الهامة في كل قدرة تنظيمية)؟

- المديرون التنفيذيون كراعاء (حاضرين) للقدرات التنظيمية.

- المديرون التنفيذيون كأبطال لمشروعات التطوير (أي مشروع تطوير تم القيام به قبل بدء مشروع الإبتكار الجذري محل الدراسة).

- المديرون التنفيذيون كمشكلين لثقافة التنظيمية.

- فهم طبيعة العملية المطلوبة لبناء هذه التوليفة المعقدة من القدرات التنظيمية الخمسة (فهم طبيعة العلاقة بين مدخلات ومخرجات عملية البناء).

ما هي مواصفات وخصائص هؤلاء المختصين التنفيذيين (المديرين التنفيذيين)؟
36. يطلق على المديرين التنفيذيين أحيانًا لقب الجهات التكيبية الفعالة نظرًا لأنها الجهات الوحيدة المسؤولة عن بناء هذه القدرات التنظيمية. هل ترى أن جهات (أو عوامل) أخرى تشكل قوى دافعة (مسببة) لبناء هذه القدرات الخمسة؟

37. هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 8: مرحلة التوجيه لمشروع الإبتكار الجذري

برمج ووصف طبيعة المرحلة الأولى لمشروع الإبتكار الجذري (مع مراعاة الترتيب الزمني للأحداث والعمليات):

- تحديد الأهداف: ما هي القضايا والمشاكل العامة السوقية والفنية التي تم بناءً عليها تحديد هذه الأهداف؟

- ما هي الآلية المتبعة لتوليد أفكار منتجات جذرية (على سبيل المثال: حلقات عصف ذهني تسعى للتوليد معرفة جديدة، أو البدء بوضع حل بسيط لهذه المشاكل واختباره من خلال مشاريع تجريبية)؟

- ما هي الآلية المتبعة لإدراك الفرصة (على سبيل المثال: إجراء دراسات وبحث لتقدير هذه الفرصة، أو السعي وتشكيل فريق للحصول على رد فعل جهات داخلية أو خارجية)؟

- ما هي الأدوار التي تقوم بها الأطراف والمؤسسات الدولية في هذه المرحلة؟

- في ضوء مدخلي الإبتكار القائم على الخصائص والمواصفات، لماذا تتطلب الأفكار الثورية طبيعة تطورية (برمج تذكر منحنى التكنولوجية S والسوقية)؟

39. هل تواجه أي أزمات أو انتكاسات خلال هذه المرحلة؟

40. هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 9: مرحلة الحضانة لمشروع الإبتكار الجذري

برمج ووصف طبيعة المرحلة الثانية لمشروع الإبتكار الجذري (مع مراعاة الترتيب الزمني للأحداث والعمليات):

- يجب أن تبدأ أي مرحلة بوضع مجموعة من الأهداف. ما هو الفرق بين الأهداف المحددة في بداية مرحلة التوجيه والأهداف المحددة في بداية مرحلة الحضانة؟

- ما هي طبيعة مرحلة الحضانة (على سبيل المثال: من حيث حالة عدم التأكد، ونوع التعلم المطلوب)؟ هل تتطلب طبيعة هذه المرحلة إعداد فريق العمل
المشارك بشكل معين؟

- لماذا يعد دراسة التجارب والمشاريع الدولية المماثلة بداية جيدة لمشروع الإبتكار؟
- كيف يتم خلق مفهوم الخدمة (service concept) الذي يسعى لإشباع الاحتياجات السوقية؟ ما هي المكونات الرئيسية لهذا المفهوم؟ ما هي الجهات الداخلية والخارجية المشتركة في بناء هذا المفهوم؟ ما هي المعايير التي يتم بناء عليها إشراك هذه الجهات؟

- كيف يتم تصميم العمليات الفرعية، وكيف يتم ربط هذه العمليات في نموذج تدفق واحد؟

قبل اتخاذ قرار باستكمال المشروع التجاري، ينبغي تحليل الآثار المرتبطة على المشروع، وإعداد مذكرة للمشروع (ميمو)، والحصول على موافقة الإدارة العليا. ما هي مكونات مذكرة المشروع التجبري؟ ما هي خصائص هذه المذكرة؟ كيف تقوم الإدارة العليا بتقديم مذكرة مشروع جديد تماما؟

- تعتبر خطة طرح وتقييم المنتج التجبري أهم خطوة في هذه المرحلة. ما هي فوائد هذه الخطوة؟ كيف يتم تحقيق أقصى قدر من التعلم خلال هذه الخطوة؟
- ما هي الفوائد الرئيسية لإعداد مقتراحات بالخطط المستقبلية للمشروع؟
- لماذا يتم وصف نموذج الأعمال بأنه نموذج غير نمطي تماما؟

ما هي الفوائد-نقاط القوة-نقاط الضعف-التهديدات المذكورة في مقترحات الخطط المستقبلية؟

ما هو المقصود تحديدًا بمفهوم بناء السفينة الذي تم تبنيه خلال بناء نموذج الأعمال؟

ما هي مجموعة الأدوات التي تم الاعتماد عليها للتنسيق بين الجهات الرئيسية المشاركة في هذه المرحلة؟

- لماذا يوصف مشروع الإبتكار الجذري بأن له طبيعة تطورية؟
- ما هي الأدوار التي تلعبها الجهات والمؤسسات الدولية في هذه المرحلة؟
- أود مناقشة نقطتين محل خلاف في أدبيات الابتكار:
  - إجراء مشروع تجريبي مقابل اختبار المفهوم.
  - نموذج شومبیتر (1) مقابل نموذج شومبیتر (2).

هل تود إضافة أي شيء آخر؟

بطاقة الإسلمة رقم 10: مرحلة التسارع لمشروع الإبتكار الجذري

- برجاء وصف طبيعة المرحلة الثالثة لمشروع الإبتكار الجذري (مع مراعاة الترتيب)
الزمني للأحداث والعمليات:
- كيف يتم تحديد واختيار وحدة العمل الاستراتيجية الملائمة لاستقبال المنتج الجديد؟ متي يتم اتخاذ قرار بإنشاء وحدة عمل استراتيجية جديدة لاستقبال المنتج الجديد؟
- من هم الأبطال الذين تم تخصيصهم لهذه المرحلة (بطل جذب وبطل فرض الابتكر)?
- هل تم تشكيك فريق عمل لنقل المنتج من مرحلة الحضانة لمرحلة التسارع؟
- هل يتبع فريق العمل خطة نقل رسمية عند دمج المنتج الجديد في نظام الخدمة الحالي (على سبيل المثال: تقديم مدى استعداد وحدة العمل الحالية لاستقبال المنتج الجديد، تحديد فجوة الإمكانيات والقدرات، ملء هذه الفجوة)?
- برجاء وصف عملية التنفيذ الفعلي للابتكر (على سبيل المثال: كيف يتم الانتهاء من أنشطة التطوير، وكيف يتم تصميم الحملة الإعلانية، وكيف يتم تنظيم دورات تدريبية للأفراد).
- أي من الآليات التالية تم تبنيها لاقتناص الفرصة السوقية الوليدة الناتجة عن الإبتكر: طرح المنتج في عدد كبير من الفروع مع اتباع نظام التحسين المستمر والسرع للمنتج، أو طرح المنتج في عدد محدود من الفروع بغرض إجراء تحسينات في هذا المنتج قبل طرحه في باقي الفروع؟
- هل تم مواجهة أي أزمات أو انتكاسات خلال هذه المرحلة؟
- هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 11: الميزة التنافسية المؤقتة
- هناك مكونين أساسيين يجب أخذهما في الاعتبار عند تحليل المزايا التنافسية المؤقتة: المنافع الممكنة من قبل العميل (مقارنة بالمنافسين)، وتكلفة تطوير وانتاج وتسلم المنتج (مقارنة بالمنافسين). هذان المكونان يجب أخذهما في الاعتبار لتحديد ما كانت المؤسسة المالية قد حفقت: ميزة التميز، أو ميزة التكلفة الأقل، أو ميزة التميز والتكلفة الأقل معاً.
- ما هي المنافع التي يقدمها المنتج الجديد؟
- هل تدرك الغالبية العظمى من الشريحة السوقية المستهدفة هذه المنافع؟
- هل استطاع أى من المنافسين تقديم منتج أكثر تميزاً (يقدم منافع أكثر للعملاء)؟
- ما هي تكلفة تطوير وإنتاج وتسليل المنتج؟
- هل استطاع أي من المنافسين تقديم نفس المنافع بتكلفة أقل؟
- هل من الممكن تحقيق كل من ميزات التنافس والتكلفة الأقل في نفس الوقت؟ إذا كانت الإجابة نعم، كيف ومنى يمكن تحقيق ذلك؟
- هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 12: الميزة التنافسية الدائمة وعوامل حمايتها
- تتحول الميزة التنافسية المؤقتة إلى ميزة تنافسية دائمة إذا استمرت لفترة زمنية طويلة (أو إذا ما فشل المنافسين في تحقيق نفس الميزة التنافسية).
- هل يمكن وصف الميزة التنافسية المحصقة بأنها دائمة أم مؤقتة؟
- ما هي العوامل التي أدت لحماية وتعرية الميزة التنافسية (على سبيل المثال: مدى تعدد المكونات المعرفية والتكنولوجية المطلوبة لإنتاج وتسليم المنتج الجديد، ومدى توفر القدرة على تحسين المنتج الجديد بشكل مستمر؟)
- هل تود إضافة أي شيء آخر؟

بطاقة الأسئلة رقم 13: الأداء المالي المتميز طويل الأجل
- أي من المقاييس الشخصية وال موضوعية التالية يمكن الاعتماد عليه عند تقييم الأداء المالي المتميز للمنتج الجديد على الأجل الطويل:
  - المبيعات؟
  - النمو؟
  - الأثر على مبيعات المنتجات الأخرى؟
  - المسؤولية الاجتماعية للمؤسسة المالية؟
  - دعم وتعريف القدرة على الابتكار (أثر التعلم)؟
  - بناء علاقات استراتيجية مع موردين وشركاء جدد (أو تعزيز العلاقات الحالية)؟
  - الربحية، صافي القيمة الحالية، معدل العائد الداخلي؟
- هل تود إضافة أي شيء آخر؟
شكرًا جزيلاً على حسن تعاونكم والوقت الممنوح من سيادتكم. وفي النهاية أود أن أستلم سيادتكم
عما إذا كان هناك جانب من جوانب تجربتك في مجال الإبتكار لم يتم تغطيته خلال هذه السلسة من المقابلات الشخصية (سواء تعلق هذا الجانب بالقدرات الإبداعية، أو بكيفية إدارة مشروع
الابتكار، أو بقياس الأداء).

أرجو من سيادتكم السماح لي بالاتصال في حالة الرغبة في الحصول على مزيد من التفاصيل.
كما أرجو من سيادتكم التكرم بالموافقة على إجراء مقابلات شخصية مكملة للتحقق من صحة أي
تعديلات سيتم إجرائها على الإطار المفاهيمي للدراسة.

ونتفضلها سيادتكم بقبول وافر الاحترام والتقدير،

طارق الشافعي
طالب دكتوراة
قسم الموارد البشرية والتسويق
كلية الإدارة، جامعة بورتسوث
المملكة المتحدة

إميل: hrm70196@port.ac.uk
تليفون (محمول): 372 3511 012 002
Appendix A.6 Background Information for Key Actors

Bank A

History and Facts
Bank A is the oldest commercial bank in Egypt. It had been established in 1898 with a capital of £1 million. Throughout its long history, the bank's functions and roles have continually developed to square with the different economic and political phases in Egypt. In 1951, a decree gave the bank the status of the Central Bank for Egypt. In 1957, the Banking Act confirmed the status of the bank as Egypt's Central Bank. In 1960, the Egyptian government nationalized the bank and created a separate central bank (the Central Bank of Egypt). After its nationalization, it acted as a pure commercial bank besides carrying out the functions of the central bank in the areas where the latter had no branches. Moreover, since mid-1960s, Bank A has been in charge of issuing and managing saving certificates on behalf of the government.

Bank A is also the largest commercial bank in Egypt. (Please note that according to the 2010 advertising campaign of the bank, the number of active customers have reached 5 million.) In June 2010, the bank’s total assets recorded EGP 299 billion (24.5% of the entire banking system); total deposits reached EGP 245 billion (27.4% of the entire banking system); and total loans granted EGP 101 billion (21.6% of the entire banking system). In June 2009, the credit cards issued reached 3.2 million cards representing 35% share of the credit card market in Egypt.

In continuation of its role in stabilizing the foreign exchange market, Bank A carried out foreign-exchange transactions with the amount of EGP 6.5 billion. Moreover, the Bank issued and opened documentary credits and letters of guarantees representing some 37% of Egypt’s foreign trade.

In June 2010, net operating revenues (before provisions and taxes) accounted for EGP 8.6 billion, net operating income accounted for 3.7 billion, and net income accounted for 2 billion.

The bank has the largest network of branches within the country (432 banking units). (Please note that this is considered to be strength in the current stage of society development, not only because the nature of services but also the society highly values human interaction (Kamel and Hassan, 2003.).) Recognizing the benefits of transformation to a cashless society and diversifying the service delivery channels, the bank was the first in Egypt to encourage the use of (Visa and Master) cards by establish Card Center (in 1995), and currently own the largest network of ATMs (on- and off-site) and P.O.S in Egypt. (Please note that the bank was the first to bear the burden of: establishing the awareness, educating the customers, and changing their habits and attitudes regarding this alternative channel.) The infrastructure of both the IT area and ATM/P.O.S has been developed and upgraded. More than 1,000 ATMs and 7,000 machines have been installed nationwide. The bank also introduces other related IT services, e.g., phone service, Interactive Voice Response (IVR) service, and Internet banking service. Other forms of alternative channels also introduced by the bank, e.g., such as phone and Internet banking. Thus, being an integral part in service production and delivery, the IT is identified as the most important infrastructural element of the bank.

The bank also created 7 mutual funds to support the Egyptian capital market and deliver services to a distributed segment of customers. Additional investment products were available through wider custodian and trading services.

Bank A succeeded in leading the market in the field of syndicated loans. As a result, Bloomberg Loan Syndications rankings for Middle East and North Africa (MENA) region ranked Bank A the 2nd in the field of arranging, marketing and underwriting syndicated loans.

According to July 2010 issue of The Banker, Bank A ranked the 237th among the top 1000 world banks in terms of total assets, ahead of all Egyptian banks, and in the 8th place among Arab banks. This performance was commended by international rating agencies. Standard and Poor's granted the Bank the same rating assigned to the Egyptian economy—i.e. (BB+) for foreign-currency long-term commitments and (B) for foreign-currency short-term commitments. The bank granted the "Best Bank in Egypt—2010" award by The Banker, and the "Best Power Deal in Africa" by the specialized emeafinance magazine.

Bank A has also an international presence through the National Bank of Egypt (UK) Limited, New York and Shanghai branches plus representative offices in Johannesburg –South Africa, Dubai–UAE, and Addis Ababa –Ethiopia. This is in addition to a vast correspondent network around the globe, mainly in Europe, Egypt's premier trade partner.
Finally, one market study for measuring the customer satisfaction regarding the retail banking business in Egypt has shown that the bank ranked first regarding the brand awareness (recording 100 percent of all customer segments). The results also have shown that the bank occupies a superior position in: its ability to achieve customer expectations regarding the diversity and quality of the financial services introduced; being the main bank in their banking transactions; and highly recommended for others.

**The Egyptian Environmental Affairs Agency (EEAA)**

**History and Mission**

The Egyptian environment is increasingly under threat from human activity. Industrial activity, construction and population growth are all factors that cause degradation of the human environment and Egypt’s valuable natural resources. The government has recognized the importance of protecting Egypt’s environment and has enacted Law 4/1994 with the objective of reducing pollution and preserving the environment for future generations.

In June 1997, the responsibility of Egypt’s first full time Minister of State for Environmental Affairs was assigned as stated in the Presidential Decree no.275/1997. From thereon, the new ministry has focused, in close collaboration with the national and international development partners, on defining environmental policies, setting priorities and implementing initiatives within a context of sustainable development. On the international and the regional levels, the Ministry of State for Environmental Affairs has hosted many conferences and cooperation protocols with countries and agencies specialized in enhancing the collaboration and transfer of experience (e.g., signature of the cooperation protocol with Romania, Ukraine, and Italy, and a collaboration strategy with Germany and Japan). This international coordination is crucial due to limited resources, lack of capability of the environmental management, coincided with the several sever environmental issues. This international assistance has been shown useful in providing financial grants, equipment, technical assistance and training, and institutional development.

At the central level, the Egyptian Environmental Affairs Agency (EEAA) represents the executive arm of the Ministry. Some of the principles functions of the EEAA include: preparing draft legislation and decrees related to the fulfillment of its objectives; preparing state of the environment studies and ees related to the fulfillment of its objectives; preparing state of the environment studies and formulating the national plan for environmental protection and related projects; following up the implementation stages of International Conventions concerned with the environment; suggesting an economic mechanism, which encourages the observation of pollution prevention procedures; and implementing pilot projects for the preservation of natural resources and the protection of the environment against pollution.

In order to realize environmental improvement, substantial investments need to be undertaken in the environmental sector. Investments are needed not only in the field of pollution control, but also in the development of environmentally friendly technology, the provision of environmental services and the establishment of sound environmental systems. This investment field has given rise to an innovative financial tool to stimulate environmental investment. It is the Environmental Protection Fund (EPF) set up by the EEAA to: receive the amount specifically allocated to it in the General State Budget by way of support, donations, and grants presented by national and foreign organizations concerned with environmental protection; fines and compensation awarded by courts of law or via out-of-court settlements for damage caused to the environment; as well as revenues from the protectorates fund. The EEAA offers incentives to institutions and individuals engaged in activities and projects directed to environmental protection purposes.

The EPF provides financial support both to projects that return a financial profit, as well as those that are non-profit. Taking into consideration the limited resources and the longer term goal of sustainable development, the fund developed practical mechanisms for environmental finance. First, applicants must be willing to provide a share of total project costs as it is the EPF’s policy not to provide a 100% of project financing. The self-contribution is important so as to better establish the “Polluter Pays” Principle as a norm and to contribute to the longer-term goal of sustainable development. Second, applicants must also secure co-finance from other sources, typically commercial banks or other lending institutions. In this respect, the EPF signed several agreements with the largest banks in Egypt to enhance this relationship with banks. This will support projects selected by the EPF for the interest rate subsidy program. In addition, the bank will draw the EPF’s attention to other environmental projects that have applied for loans. The collaborating bank will evaluate the project application to determine the creditworthiness of the project holder in accordance with the agreement with the EPF.

Several kinds for projects are considered for funding. Examples are projects that address severe...
environmental problems and in need of urgent solutions; serve a large number of beneficiaries, have the potential for disseminating environmental know-how and technology to others (replicable in other areas with similar problems); integrate and foster partnerships among various stakeholders, agencies and sectors; contribute to the achievement of developmental objectives such as job generation, poverty alleviation, and empowerment of women.

The EPF offers financing for projects on a competitive basis. Proposed projects are evaluated based on a number of criteria (environmental merit, financial viability, thoroughness of design and preparation, capability of the applicant, conformity with environmental priorities for the year, etc.) and the best projects are selected for funding. Projects selected by the Fund Management Committee sign agreements with the EPF, partner banks, etc., and disbursement of funds is based on schedules detailed in the signed contracts. The EPF conducts continuous monitoring and evaluation of ongoing projects to ensure adherence to the terms of the contract and successful implementation of the project.

**The Ministry of Interior (MOI)**

The Traffic Department is one of the specialized police sectors of the Ministry of Interior (MOI). In the current context, the role of the Ministry of the Interior is crucial in that it is this ministry that is responsible for enforcing the legal and regulatory framework.

Source: Internal documents and actors’ Websites.