4.2.4.6 Raper (1998)'s Quality Function Deployment Approach to Packaging Design

Raper looks at the development of an integrated approach to packaging design, by using Quality Function Deployment; and in particular, focusing on the 'house of quality'. The approach enables the 'mapping' of the elements, activities, and events necessary in order to achieve customer satisfaction. Figure 4.13 provides an example of how QFD can be used to translate the customers’ needs (left column) into elements when designing the packaging. It is suggested that this can be applied at each of the main stages of the NPD process: product planning, part deployment, process planning and production planning. However, the focus is almost purely on customer needs, and no insight is provided into how new technological opportunities may be identified. Nor is any insight given into organisations’ actual management of packaging, or the relationship between product and packaging development.

Figure 4.13: Generic House of Quality (Raper, 1998: p. 5)
4.2.4.7 Vernuccio et al (2010)’s Framework of Packaging Innovation

Vernuccio et al. (2010) develop a conceptual framework which attempts to draw together the areas of marketing, logistics, ethics, and packaging innovation: highlighting that traditionally, each area is dealt with separately within the literature, resulting in the lack of an integrated approach. Vernuccio et al (2010)’s framework focuses on integrating packaging decisions at the physical and communicative level, enhancing the packaging in terms of its functions to marketing, logistics, and ethics. Their conceptual framework (Table 4.7) aims to link decisions with respect to the packaging’s functions (top row) and its managerial roles (left column): leading to a more integrated approach, which takes into account the variety of functions performed by the packaging throughout its lifecycle, an is also supported by Garcia-Arca et al (2008).

Table 4.7: Conceptual framework: Potential for physical and communicative integration among marketing, logistics, and ethics dimensions (p. 342)

<table>
<thead>
<tr>
<th>MANAGERIAL FIELDS</th>
<th>PHYSICAL FUNCTIONS</th>
<th>COMMUNICATIVE FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Co-existence of marketing, logistics and ethics dimensions</td>
<td></td>
</tr>
<tr>
<td>MARKETING</td>
<td>Practical value</td>
<td>Practical value</td>
</tr>
<tr>
<td></td>
<td>Ideal value</td>
<td>Ideal value</td>
</tr>
<tr>
<td></td>
<td>Emotional value</td>
<td>Emotional value</td>
</tr>
<tr>
<td></td>
<td>Critical value</td>
<td>Critical value</td>
</tr>
<tr>
<td>LOGISTICS</td>
<td>Protection and conservation</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Handling and transport</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Manipulation and storage</td>
<td>-</td>
</tr>
<tr>
<td>ETHICS</td>
<td>Eco-compatibility</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>Safety</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>Societal orientation</td>
<td>Socio</td>
</tr>
<tr>
<td></td>
<td>Social solidarity</td>
<td>Social solidarity</td>
</tr>
</tbody>
</table>

Based on a secondary data study of packaging innovations, the authors suggest that a holistic view of packaging in innovation can be beneficial to its management, and lead to new opportunities to be exploited. Whilst their article provides some key linkages between packaging’s functions and innovation, it fails to provide practical insights into firms’ actual management of packaging with respect to new innovations, or the practical integration of packaging into the core product’s development.
4.2.4.8 Simms and Trott (2010)’s Conceptual Model of Packaging Idea Generation

Simms and Trott (2010)’s conceptual paper arguably adopts a similar approach to that of Vernuccio et al. (2010), attempting to incorporate a range of packaging’s functions to development. The framework they present (Figure 4.14) focuses on the generation of new packaging ideas, as opposed to looking at development or integration more comprehensively. The contributions of their framework identify the need to consider the distribution channel (including the recycler), and the various layers of the product’s packaging. A limitation, though, lies in the lack of primary data collection with which to provide insights into packaging management.

Figure 4.14: Packaging Conceptual Framework: The five faces that need to be considered in the development of effective packaging (Simms & Trott, 2010: p. 410)

![Diagram of Packaging Conceptual Framework]
Coles & Beharrell (1990)’s paper on packaging innovation in the food industry develops a unique framework for obtaining competitive advantage in the supply chain. It identifies three factors contributing to packaging innovation, which are consumer, distribution, or technology driven. This aims to develop an optimisation strategy based on a total systems approach. The framework exemplifies how external influences impact on packaging innovation, while process, consumer and distribution changes provide new technological opportunities. In turn, this impacts on the marketing and distribution of the product.

The framework encapsulates many aspects of the prior discussions, in terms of the consumer, process, and distribution channel. Unique, however, is its identification of technology-based factors, and the incorporation of process developments. But the article adopts a primarily consumer driven approach, providing limited focus on technologically driven development; And moreover, little insight is provided into actual development processes or integration (reflecting its conceptual nature). It is also notable that the discussions of the critical factors in the article are relatively dated, having been published in 1990.
4.2.4.10 Summary of Models and Frameworks

The preceding discussion of models and frameworks reveals the existing literature to be focused primarily on packaging design, rather than developmental and technological innovation. In addition, a number of articles focus on packaging innovation, but are primarily conceptual in nature. The majority also tends to promote a particular approach, rather than attempt to generate insights into firms’ management. Again, this only further informs the rationale for this research.
4.3 NPD and Innovation in process industries

Prior discussions, both in this chapter and chapter three, have primarily focused on the findings of research within the FMCG industry. The remainder of this chapter places these insights in context, based on relevant perspectives of the wider NPD and innovation literature. This begins with a discussion which characterises NPD within process industries, particularly highlighting the significance of the production process on product innovation. It then moves on to explore the significance of collaboration, and the importance of absorptive capacity in collaborative product development.

4.3.1 NPD in Process Industries: Characterising NPD and Identifying the Significance of the Production Process

FMCG industry can be characterised as a process industry. Process industries span a number of sectors (Lager & Blanco, 2010), which can be divided into the following main groups: food, paper and cardboard, chemicals, raw oil, rubber and plastics, building materials, pottery and glass, primary metal, and energy (Koene, 1988; Lager and Blanco, 2010; Lager, 2000). Within process industries, developing new and improved products with greater functional performance is essential for delivering improved margins and profitability (Reichstein and Salter, 2006; Leonard-Barton, 1992). This can be achieved by adding to the level of differentiation in the product offering (Linn, 1984; Lager, 2000), allowing a company to increase premiums by moving the product from commodity status (Lager, 2000; Lager and Blanco, 2010), thereby switching the buying decision away from being purely cost driven (Bomsel and Roos, 1990). Yet despite the significance of NPD within these industries, NPD and innovation literature has a tendency to overlook them and focus on more technology intensive industries (Lager, 2000; Lager & Blanco, 2010).

The food packaging industry has many characteristics of a typical process industry (Table 2.1): such as high capital investment, high production speed, rigid process control, clear determination of capacity, one routing for all products, low product complexity, and strong impact of changeover times (Fransoo and Rutten, 1994; Wallace, 1984). This can act as a barrier to innovation, as the associated importance of being cost-effective in production forces R&D to look both ways in terms of delivering process innovation improvements and creating new product opportunities. This represents a dilemma in the management of NPD and R&D, for it creates a high
level of pressure on the latter to provide evidence of its contribution (Lager and Blanco, 2010).

An orientation towards minimizing costs is particularly apparent in many mature industries, such as both the FMCG and packaging industries, where price based competition is high. This is captured in Utterback and Abbernathy’s innovation lifecycle (1975), in which the third specific phase is where competition shifts from differentiation to product performance and costs (Figure 4.16). Companies will focus on serving specific customer segments, and manufacturing will use highly specialised equipment with the ability to produce the product on a large scale. The industrial context thereby shapes decision making, as illustrated in Porter’s taxonomy of technology strategies (Porter, 1985). In this framework, process innovation is often associated with the attempts of firms to achieve cost leadership in their market segment, or focus on cost reductions in the production of existing products.

Figure 4.16: Utterback and Abernathy’s model of industrial product and process innovation (1975: p. 645), modified from Milling and Stumpfe (2000).

Within the food sector itself, Traill and Meulenburg (2002), and Gehlhar et al. (2009), have observed the process orientation within many firms, suggesting that this is effectively in opposition to a product (innovation) orientation (Figure 4.17; Table 4.9). This orientation to process innovation is particularly pertinent amongst cooperative
and non-branded manufacturers; although most food firms are generally more innovative in terms of recipes than their processes (Norton et al., 2006).

Figure 4.17: Firm orientations and competitive pressures acting on firms (Adapted from Gehlhar et al., 2009: p. 116)

Table 4.9: Firm orientations and description (Adapted from Gehlhar et al., 2009: p. 117)

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Primary firm emphasis</th>
<th>Examples of firm activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Gain high level expertise in gathering and analysing current market trends</td>
<td>Conduct market surveys, consumer testing of new products</td>
</tr>
<tr>
<td>Process</td>
<td>Readily adopts processes for reducing organisational boundaries, increases efficiencies in physical and informational flows for reducing costs in production, distribution, and financial transactions</td>
<td>Implement cutting edge information services, upgrade to state of the art equipment, establish efficient networks with partners</td>
</tr>
<tr>
<td>Product</td>
<td>Extensive product knowledge to enhance quality, stress creativity in products, strive for superior quality</td>
<td>Conducts and monitors international R&amp;D, develops innovative specialty products or functional foods using sophisticated ingredients</td>
</tr>
</tbody>
</table>

The cost focus within firms impacts on technological product innovation, particularly due to associated production line changes. Some 97% of innovations incorporate both product and process innovation attributes (Simonetti et al., 1995). Recently,
Bunduchi and Smart (2010) reviewed the process innovation literature and developed a model of the costs associated with adoption: including capital, development and switching costs. The identification of these three types of costs illustrates the potentially significant expense posed by the process change associated with product technology changes.

Benner and Tushman (2002)'s study of the paint and photographic industries suggests that the focus on minimum costs within a firm can result in a shift in the balance of innovation towards efficiency, at the expense of long term adaptation. This in turn creates an emphasis on exploitative activities, crowding out more significant innovations (Benner and Tushman, 2002). Whilst these activities may help firms learn and adapt quickly in the short term, they were seen to inhibit a longer-term focus and lead to inertia (Levinthal, 1991, 1997a; Repenning and Sterman, 2002). This creates a pressure on R&D to improve the product and production process to lower costs over time, which in turn can stifle opportunities for more significant innovation.

The literature on organisational capabilities provides further insight into barriers to change, identifying differences in the resources and environment necessary for developing incremental and radical innovations. Capabilities are difficult to create and costly to adjust (Nelson and Winter, 1982; Hannan and Freeman, 1984). Incremental innovation reinforces the capabilities of established organisations, while radical innovation forces them to ask a new set of questions, draw on new technical and commercial skills, and employ new problem-solving approaches (Burns and Stalker, 1966; Hage, 1980; Ettlie, Bridges, and O'Keefe, 1984; Tushman and Anderson, 1986). The impact of this on the nature of innovation activities is that as the organisation learns and increases its efficiency, subsequent innovation is increasingly incremental (Levinthal and March, 1993; Benner and Tushman, 2003). Another constraint that can arise from this is a shift to meeting existing customer needs (Christensen and Bower, 1996; Trott, 2001; Christensen, 1997). Hence within large well-established organisations, the environment tends to favour incremental innovations that deliver benefits for existing customer groups, and process developments.

### 4.4 Collaboration and Supplier Incorporation

Research into process industries has shown that supply chain collaborations are
important to R&D and innovation (Cantista and Tylecote, 2008, Sahay, 2003, Soosay et al., 2008). Successful development often depends on companies’ level of understanding and experience of operating in chain-like structures (Tottie and Lager, 1995). Whilst firms have many potential partners (Pittaway et al., 2004), supplier-customer relationships have received particular attention within the literature (Petersen et al., 2003; Chung & Kim, 2002; Lambert, 2008; Wynstra et al., 2010). For the supplier, developing a close relationship is critical to gaining the required inputs from customers into the development project (see Leifer et al., 2000). Beyond this, the incorporation of suppliers allows a greater understanding of their needs (Freeman, 1982; Bruce and Rodgus, 1991). This can aid the development of new ideas (Biemans, 1991), and reduce risks (Gemunden et al., 1992).

Increasing levels of outsourcing (Fine, 1998; Wynstra et al., 2010) has led to modularisation of products (Baldwin and Clark, 2000), as the product offering becomes distributed across many firms. Suppliers have therefore adopted a larger role in the development of these modules or components, across a range of industries (Appleyard, 2003; Brusoni and Prencipe, 2001; Laseter and Ramdas, 2002; Lawson et al., 2009; Primo and Amundson, 2002; Sobrero and Roberts, 2002; Wagner and Hoegl, 2006). This has resulted in firms moving away from ‘arm’s length’ or transaction orientated purchasing relationships with suppliers, towards more integrated relation-oriented ones (Lambert, 2008; Wynstra et al., 2010).

Particular individuals in the NPD team frequently play a key role in promoting supplier communication. First, ‘heavyweight’ leaders have been found to engage in significant external communication and vision setting, leading to more productive projects (Clark and Fujimoto, 1991). These are powerful senior NPD managers with substantial expertise, and the decision-making authority to champion and direct product development efforts (Wheelwright and Clark, 1995). The heavyweights are empowered to lead the projects, and reorganize the sequential process into a concurrent one, in which product engineering, process engineering, and manufacturing planning activities overlap (Koufteros et al., 2002; Hong and Schniederjans, 2000; Clark and Fujimoto, 1990).

Second, the presence of product ‘champions’ has been found to overcome resistance in NPD projects, cultivate coalitions and encourage coordination (Chakrabarti, 1974; Rothwell et al., 1974; Bachalandra, 1996; Markham and Griffin, 1998). Moreover, these individuals can obtain resources, and coach others on how to
get a product onto the market. Littler et al (2003)’s study in particular found that employing a product or collaboration champion increased the likelihood of success of collaborative NPD.

Cooperation within the supply chain is also influenced by a firm’s position within it. Cooperative development is more common with ‘first tier’ suppliers (with which the customer has a direct purchasing and product input relationship), than with second, third and below (Fujimoto, 2001; Wynstra et al., 2010). In this study, higher levels of collaborative development would therefore be expected to be evident among FMCG firms (Figure 4.4), which suggests that much of the packaging development work is undertaken by suppliers (Rundh, 2005).

Given the significance of packaging to the activities of intermediaries and retailers, we may also expect a willingness to cooperate at these other (further ‘downstream’) levels of the supply chain. However, prior studies have highlighted low levels of cooperation, particularly within the packaged food and drink sectors (Stewart-Knox and Mitchell, 2003; Van Dalen et al., 1997). Further, it is interesting to note the observations of Lindgreen and Wynstra (2005) with respect to suppliers of commodity products. Their research suggests that the level of collaboration between a supplier and customer may be dependent on whether the former supplies commodity or functional products. Based on their research, a packaging supplier providing products of a commodity-based nature may experience lower levels of collaborative development, due to perceptions that they add little value. This carries a risk, however, as the packaging they supply may not fully reflect their technological and innovative capability (Lindgreen and Wynstra, 2005).

4.4.1 Absorptive capacity and collaboration

Prior research has highlighted that the potential for the supplier to productively contribute to the customer’s R&D is dependent upon the customer maintaining internal capabilities, in order for the value of new technologies to be recognised internally. This is captured in the concept of absorptive capacity (ACAP), which is receiving increasing attention in the literature (Cohen and Levinthal, 1990; Brennan and Turnbull, 1999; Ford and McDowell, 1999; Ritter, 1999; Murray and Chao, 2005; Gries and Fischer, 2001; Tsai, 2001; Tsai, 2002; Verona, 1999; Abecassis-Moedas and Mahmoud, Jouini, 2008). At a basic level, the concept is focused on an organisational learning (Huber, 1991; Kim, 1998) and receptivity to technical change.
(Kedia and Bhagat, 1988). The importance of this is growing, as firms increasingly build innovation capacity by tapping into external knowledge sources (Chesbrough, 2003; Laursen and Salter, 2006).

Table 4.10 provides an overview of some of the key conceptualisations of ACAP in the literature. Arguably most widely recognised is the study of Cohen and Levinthal (1990), in which the authors define the concept as the “ability to identify, assimilate, and exploit knowledge from the environment” (1989: 589, 1990, 1994). This can require a broad array of skills and trained experts within the firm, which itself is related to the latter’s prior knowledge base, activities and experiences (Kim, 1998; Mowrey and Oxley, 1995). Building on Cohen and Levinthal (1990)’s definition, Lane, Koka, and Pathak (2006) define ACAP, and provide key insights into the processes involved:

Absorptive capacity is a firm’s ability to utilize externally held knowledge through three sequential processes: (1) recognizing and understanding potentially valuable new knowledge outside the firm through exploratory learning, (2) assimilating valuable new knowledge through transformative learning, and (3) using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning (p. 856).

Zahra and George (2002)’s paper builds on this further, summarising the concept as consisting of four dimensions (pp. 189-191):

1. Acquisition: the ability of the firm to identify and acquire an externally developed technology or external knowledge. This is dependent on the firm undertaking activities to identify new knowledge, being able to identify and learn from it, and being able to gather this knowledge with reasonable speed.

2. Assimilation: the analysis process, interpretation and comprehension of the external technology. This is heavily reliant on internal understanding, in order to comprehend the new knowledge within a reasonable timeliness.

3. Transformation: the capability to develop and refine processes for combining existing knowledge and newly assimilated knowledge. This will provide the firm with new insights and present new opportunities.

4. Exploitation: capability based on routines which enable the organisation to refine, extend and leverage existing competencies, or create new ones by incorporating newly acquired knowledge. This is based on set systems
which enable it to harvest and incorporate the knowledge, and in turn, create new innovations.

Table 4.10: Dimensions of ACAP: A re-conceptualisation of Components and Corresponding Roles, from Zahra and George, 2002 (p. 189).

<table>
<thead>
<tr>
<th>Dimensions/Capabilities</th>
<th>Components</th>
<th>Role and importance</th>
<th>Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td>Prior investments</td>
<td>Scope of search</td>
<td>Boyton, Zmud &amp; Jacobs (1990); Cohen &amp; Levinthal (1990); Keller (1996); Kim (1998); Lyles &amp; Schwenk (1996); Mowrey, Oxley &amp; Silverman (1996); Van Wijk, Van den Bosch &amp; Volberda (2001); Veugelers (1997)</td>
</tr>
<tr>
<td></td>
<td>Prior knowledge</td>
<td>Perceptual schema</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intensity</td>
<td>New connections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Speed</td>
<td>Speed of learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direction</td>
<td>Quality of learning</td>
<td></td>
</tr>
<tr>
<td>Assimilation</td>
<td>Understanding</td>
<td>Interpretation</td>
<td>Dodgson (1993); Fichman &amp; Kemerer (1999); Kim (1998); Lane &amp; Lubatkin (1998); Szulanski (1996)</td>
</tr>
<tr>
<td>Transformation</td>
<td>Internationalisation</td>
<td>Synergy</td>
<td>Fichman &amp; Kemerer (1999); Koestler (1966); Kim (1997b, 1998); Smith &amp; DeGregorio (in press)</td>
</tr>
<tr>
<td></td>
<td>Conversion</td>
<td>Recodification</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bisociation</td>
<td></td>
</tr>
<tr>
<td>Exploration</td>
<td>Use</td>
<td>Core competencies</td>
<td>Cohen &amp; Levinthal (1990); Dodgson (1993); Kim (1998); Lane &amp; Lubatkin (1998); Szulanski (1996); Van den Bosch &amp; Volberda (2001); Volberda &amp; Boer (1999); Van Wijk, Van den Bosch &amp; Volberda (2001)</td>
</tr>
<tr>
<td></td>
<td>Implementation</td>
<td>Harvesting resources</td>
<td></td>
</tr>
</tbody>
</table>

Zahra and George (2002) develop the main body of the literature by suggesting that ACAP exists at two subsets: potential (PACAP); and realised (RACAP). ‘Potential’ consists of the firm’s capability to value and acquire knowledge and assimilate capabilities; but does not ensure that it will be able to exploit it. On the other hand, ‘realised’ consists of knowledge transformation and exploitation, and hence enables the firm to leverage knowledge that has been absorbed. Therefore, success is dependent on both subsets, in order to extract value from external knowledge.

The literature identifies a number of antecedents to, and factors influencing, ACAP. Based on the model of Zarah and George (2002), these include: external source, social integration mechanisms, experience and knowledge complementarity, appropriability and competitive advantage, and triggers. The key findings of prior research in these areas are briefly addressed below.

ACAP is dependent upon an organisation accessing external knowledge; thus, the
breadth and depth of knowledge exposure is important (Ivan Wijk et al., 2001), and linked to the organisation’s networks. A firm’s past experience will therefore be paramount: defining the areas in which it seeks possible technological developments, influencing its’ learning based on what it does, and the process through which it interprets incoming information, and acts on it. Hence ACAP is path dependent.

Linked to this are social integration mechanisms at work, as the acquisition of knowledge is also reliant on the sharing of knowledge among members of the firm, both formally and informally (Spender, 1996; Zahra and George, 2002). Therefore, the combination of external knowledge gathering and internal sharing of knowledge, including social integration, is key (Matusik and Hill, 1998; Zarah and George, 2002).

The receptivity of an organization, and its ability to learn, is dependent on internal capabilities that enable it to understand and recognise the value of external knowledge, as well as being able to utilise it for commercial means (Koza and Lewin, 1998; Zahra and George, 2002; Abecassis-Moedas and Mahmoud, Jouini, 2008). It is based on the ability to understand and learn from related, but ultimately different, knowledge to that currently existing within the firm (Lofstrom, 2000); and is dependent on prior knowledge and experience (and hence, past ACAP), as well as complementarity between the recipient and source teams (Cohen and Leventhal, 1990; Abecassis-Moedas and Mahmoud, Jouini, 2008; Abecassis-Moedas and Mahmoud-Jouini, 2008). Prior R&D investments and the knowledge linked to these are therefore a key determinant in ACAP (Ahuja, 2000; Cockburn and Henderson, 1998; Lane and Lubatkin, 1998; Lyles and Salk, 1996; Mowery et al., 1996; Pennings and Harianto, 1992; Pisano, 1994; Powell et al., 1996; Shane, 2000; Stuart, 1998; Tsai, 2001).

The path dependent nature of absorptive capacity means that firms may fall into a number of traps, preventing it from foreseeing radical innovations that will transform the industry (Christensen, 1997; Zajac and Bazerman, 1991). Ahuja and Lampert (2001) observe three types of competency trap: familiarity traps resulting from an overemphasis on refining existing knowledge; maturity traps resulting from the need to have reliable and predicable outcomes (limiting exploration of new knowledge); and propinquity traps, which relate to a disposition to explore knowledge in areas closest to existing expertise. It is worth noting that the disposition towards exploring existing technologies is commonly linked to a firm’s sunk investments, such as production line equipment (Section 4.5.1), although these costs can themselves be
linked to and reduced by knowledge and experience of a technology (e.g. PACAP can reduce these investments) (Teece, et al., 1997; Zander & Kogut, 1995; Zott, 2001). It has also been found that a firm’s investments in ACAP can, but are not always (Cohen and Levinthal, 1990), linked to the appropriability of advantages: in this case, product related (such as intellectual property). Hence willingness to change can increase in cases where barriers to appropriability are higher in the industry (Spence, 1984).

Finally, it is worth noting that the literature suggests firms’ ACAP activities are frequently activated by a trigger: such as an event, crisis, new strategy, technological shifts, the emergence of new dominant designs, new government policies, or performance failure (Walsh and Ungson, 1991; Winter, 2000; Zarah and George, 2002). This will intensify a firm’s efforts to acquire new information and knowledge. When seen alongside to the traps discussed above, this appears unsurprising.

4.5 Specialist Packaging Design Agencies

When it comes to the management of packaging, one final potential external partner warrants mention: specialist design firms. These firms, or agencies, are recruited to aid in packaging development and design. Existing research lacks insight into their involvement; however, the wider NPD and design literature provides us with some understanding of the role of external design specialists.

The management of designers has been found to present a unique challenge, when compared to other NPD team members (Munsch, 2004). The outsourcing of design has been found to be beneficial to creativity (Munsch, 2004). Designers can gain freedom by being independent from the business, and its competitive pressures, protecting them from commercial and production based limitations: “Reliance on market research or feasibility studies may restrain the creative process or alter the original concept” (Ravasi and Lojacono, 2005, p. 59). Moreover, external designers bring in diversity of ideas and views beyond an internal corporate perspective (Abecassis-Moedas and Mahmoud-Jouini, 2008).

The outsourcing of design carries with it many benefits; but design itself plays an important role in R&D and innovation (Walsh, 1996). Thus for an organization, the opposing challenge lies in integrating this function into the NPD team (Abecassis-Moedas and Mahmoud-Jouini, 2008), in order to gain these benefits. Indeed,
Abecassis-Moedas and Mahmound-Jouini (2008) note that providing excessive design freedom, resulting from disconnect with R&D activities, can be damaging. Managing the integration of design experts therefore represents a key challenge.

Abecassis-Moedas and Mahmound-Jouini (2008), citing a number of researchers (Berger et al., 2005; Borja de Mozota, 2003; Veryzer and Borja de Mozota, 2005), have identified four main approaches to integrating design:

1. Integration with technical functions, whereby designers work with the engineering design, isolated from the marketing and the communication on the product of the firm.
2. Integration to marketing, whereby designers work on the ways to differentiate the product, focusing on the point of view of the user.
3. Integration to communication, whereby designers work on the brand and its identity.
4. Integration at the same level of the firm’s other functions, whereby designers play a specific role, and interact equally with all other functions through the NPD process.

The final type of integration is more comprehensive, adopting a more holistic position corresponding to the design, as a synthesis of technology and human needs into manufacturing products (Crawford and Di Benedetto, 2003), thus incorporating aesthetics, ergonomics, and ease of manufacture. While these insights do not specifically address the role of specialist agencies in packaging development, they do reinforce the need to consider the input of such firms into development.

4.6 Summary
This chapter has provided insights into the importance of packaging to the product and its success, particularly in terms of the roles it must perform. However, those existing articles which do provide insights into development are largely conceptual and theoretical, design orientated, or focus on particular approaches that may be applied in development and design (such as QFD). They therefore fail to provide detailed insights into actual packaging development activities within companies, or the integration of packaging into NPD within organisations. They also overlook the factors that influence the management of packaging within the company and its NPD, or those impacting upon technological input.
The later sections of this chapter have illustrated that in general, the current literature, and models within it, do not account for the nature of the industry. In particular, they do not allow for the significance of the production process, or the nature of the mature process industry. Furthermore, there is a lack of insight into the existing literature and models, with regards to the input of suppliers or their interaction with either product manufacturer or brand owner.