Investigating the factors affecting readiness for lean system adoption within Kuwaiti small and medium-sized manufacturing industries

Mohamad AL-Najem

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Abstract

The central belief in lean systems (LS) is that the implementation of lean practices will reduce different type of wastes. However, LS implemented without an evaluation of organisational readiness may lead to failure. In this study, a measurement framework to evaluate the lean readiness (LR) and LS within Kuwaiti small and medium-sized manufacturing industries (K-SMMIs) has been developed. This measurement framework encompasses the quality and management practices related to LS (processes; planning and control; human resources (HR); top management and leadership; customer relations; and supplier relations) to assess the practices in K-SMMIs and determine whether they have the foundation to implement LS.

Mixed methods are adopted in this study, including quantitative approaches (questionnaire administered to 50 K-SMMIs and structured observation conducted in 27 K-SMMIs), and qualitative approaches (two case studies (observation and semi-structured interviews with staff of various levels), and semi-structured interviews with 27 managers of K-SMMIs and 26 experts). In addition, a comprehensive literature review has been carried out. The findings indicate that current quality and management practices within K-SMMIs are not very supportive towards LS. Many factors are revealed, both external and internal, that affect K-SMMIs with respect to LS readiness, including language barriers, and deficiencies in aspects including quality workers in terms of education and skills; technology; government attention; know-how regarding LS; market competitiveness; and urgency for adopting LS.

This LS and LR measurement framework relating to K-SMMIs provides a unique effort in the area of lean system, and the study’s findings can be used as an internal checklist prior to and during LS implementation. However, this research study contains some obvious limitations, such as very limited information being available on LS and quality initiatives in Kuwait, and small sample size. Further, the LR framework should be tested in small and medium-sized manufacturing industries that have successfully used LS, in order to provide a benchmark.

Keywords – Lean system, Kuwaiti small and medium-sized manufacturing industries, lean assessment framework, critical success factors, lean readiness,
Kuwait, national culture, organisational culture, Toyota production system, small and medium-sized enterprises.
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Declaration

I, Mohamad AL-Najem, hereby clarify that I personally carried out the work presented in this thesis, entitled “Investigating the factors affecting readiness for lean system adoption within Kuwaiti small and medium-sized manufacturing industries”.

I confirm that all of the material contained herein is my own work, and was written by me. I also declare that all of the quotations used in this thesis have been properly acknowledged.

This thesis has not been submitted for the award of any degree or diploma, or its equivalent, to any other university or institution prior to this date.

Signed: __________________________  Date: __________________
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<tr>
<td>5s</td>
<td>Sort, set in order, shine, standardise, and sustain</td>
</tr>
<tr>
<td>CI</td>
<td>Continuous improvement</td>
</tr>
<tr>
<td>CSFs</td>
<td>Critical success factors</td>
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<tr>
<td>FDI</td>
<td>Foreign direct investment</td>
</tr>
<tr>
<td>GBP</td>
<td>Great British Pound</td>
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<tr>
<td>GCC</td>
<td>Gulf Cooperation Council</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>HR</td>
<td>Human resources</td>
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<td>HRM</td>
<td>Human resources management</td>
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<td>ISO</td>
<td>International organisation for Standardisation</td>
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<td>JIT</td>
<td>Just in time</td>
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<tr>
<td>KD</td>
<td>Kuwaiti dinar</td>
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<td>KPAI</td>
<td>Kuwait public authority of industries</td>
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<td>Kingdom of Saudi Arabia</td>
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<td>LR</td>
<td>Lean readiness</td>
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<td>M</td>
<td>Mean</td>
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<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
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<td>MRP</td>
<td>Materials requirement planning</td>
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<td>OEE</td>
<td>Overall equipment effectiveness</td>
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<td>PDCA</td>
<td>Plan-do-check-act</td>
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<td>POUS</td>
<td>Point of use storage</td>
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<tr>
<td>QC</td>
<td>Quality circles</td>
</tr>
<tr>
<td>QI</td>
<td>Quality initiative</td>
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<td>SMMIs</td>
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<td>SPC</td>
<td>Statistical process control</td>
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<td>TPM</td>
<td>Total productive maintenance</td>
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<td>TPS</td>
<td>Toyota production system</td>
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<td>TQM</td>
<td>Total quality management</td>
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<tr>
<td>UAE</td>
<td>United Arab emirates</td>
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<tr>
<td>UK</td>
<td>United kingdom</td>
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<tr>
<td>US</td>
<td>United states</td>
</tr>
<tr>
<td>USD</td>
<td>United States dollar</td>
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<td>VC</td>
<td>Visual control</td>
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<td>VSM</td>
<td>Value Stream Map</td>
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<td>WIP</td>
<td>Work in progress</td>
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## Glossary

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<td>Housekeeping or organising the working area</td>
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<td>It is Japanese word which means shop floor or workplace. Go to the gemba which means go to the place where value is added.</td>
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<td>Genchi</td>
<td>Go to the source to make the correct decisions or go and see yourself</td>
</tr>
<tr>
<td>Genbutsu</td>
<td>Go to the place where value is added.</td>
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<tr>
<td>Heijunka</td>
<td>Level scheduling</td>
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<tr>
<td>Hoshin Kanri</td>
<td>Aligns resources and precisely explains the goals to be achieved.</td>
</tr>
<tr>
<td>Jidoka</td>
<td>Automation with a human touch</td>
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<td>Kaizen</td>
<td>Continuous improvement</td>
</tr>
<tr>
<td>Kanban</td>
<td>Card signal or sheet used to authorize production or movement of an item</td>
</tr>
<tr>
<td>Muda</td>
<td>Wastes</td>
</tr>
<tr>
<td>Poka-yoke</td>
<td>Error or mistake proofing</td>
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<tr>
<td>SMED</td>
<td>Single Minutes Exchange of Dies, Quick changeover and set-up reduction</td>
</tr>
<tr>
<td>TAKT time</td>
<td>The time required to produce a single component or an entire product based on customer demand. It is determined by dividing the available production time by the rate of customer demand</td>
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Acknowledgements

First, I would like to express my sincere thanks to my supervisor, Dr Hom Dhakal, for his support and help, both personally and technically. He is not only a supervisor, but also a great friend.

I would like to thank my parents for their endless support and love. They have always given me their love and encouraged me in all my pursuits. They have been waiting since 1999 to see me fulfil my dream of achieving a PhD, and I hope that I have done them proud, and that after the long absence we can finally be together again. I want to thank my brothers and sisters for their full support and care, and for the sweet messages I receive from them on a daily basis. I also want to acknowledge the support and encouragement I have received from my sisters in law – thank you all.

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I would like to thank all the people who have helped me with, and participated in, my research: managers and workers from the Kuwaiti manufacturing industries; experts from Kuwait University, the Industrial Union, the Public Authority of Industries, and the Chamber of Commerce; and consultants. A special thanks goes to the general managers from the firms that allowed me to spend a few days in their companies to conduct the case study. I must also express my thanks to Jinny Hayman of Stickler Proofreading for her hard work in proofreading my thesis.
Dissemination

Publications in peered reviewed scientific journals


Publications in conferences and symposium papers


Submitted publications in peer review scientific journals (under review)

Chapter One  Introduction

1.1 Introduction

In the last decade, lean systems (LS) have made a noteworthy impact in both the academic and industrial community (Hines et al., 2004). Organisations around the globe are opting to implement LS to eliminate waste and increase productivity in their businesses. Most of these organisations have adopted LS because the approach has demonstrated an overwhelming influence on the restructuring of the global industry, as it basically aims to increase production efficiency via the elimination of wastes in all its forms (Abdul Raman and Jamaludin, 2008), and, if properly implemented, could lead the organisation towards global manufacturing excellence (Papadopoulou and Ozbayrak, 2005). As stated by Womack et al. (1990, p. 225):

[LS] is a superior way for humans to make things. It provides better products, in wider variety at lower cost. Equally important, it provides more challenging and fulfilling work for employees at every level, from the factory to headquarters. It follows that the whole world should adopt lean production, and as quickly as possible.

The success of Toyota (the inventor of LS) has drawn the attention of academics, researchers, and executives seeking to benchmark the company’s famous Toyota production system (TPS), or “LS” (Bartezzaghi, 1999; Liker and Hoseus 2010; Bicheno et al., 1997; Emiliani, 2006; Womack et al., 1990; Stone, 2012a). However, despite its pervasiveness, there is increasing concern in the corporate world about the implementation of LS in both large firms, and small and medium-sized enterprises (SMEs). According to Stone (2012b), there is still a lack of empirical study with regard to the subject of LS.

Many researchers and LS practitioners have covered lean topics from different perspectives; despite the large amount of articles on LS that have emerged over the past four decades, however, lean practices within the SME context is a very under-researched area (Boughton and Arokiam, 2000; Stone, 2012b). According to Bakás et al. (2011), in the past 20 years there have been only 16 journal articles that have addressed LS within SMEs. Moreover, there are only a few studies that contain
empirical evidence regarding factors that affect the implementation of lean practices within SMEs (Shah and Ward, 2003; Achanga et al., 2006; Golicic and Medland, 2007; Stone, 2012b).

Some of the extant articles cover different areas of LS, such as lean practices, lean benefits and lean critical success factors (CSFs), in both large companies and SMEs that are primarily based out of expansive premises. These studies have considered various country contexts, including India (Antony, 2006; Dhandapani et al. 2004; Upadhye et al., 2010a), the US (Zhou, 2012; Golicic and Medland, 2007; White et al., 1999), Australia (Sohal and Egglestone, 1994), Canada (Stuart and Boyle, 2007), Europe (Bakås et al., 2011; Bonavia and Marin, 2006; Achanga et al., 2006; Johansen et al., 2004; Bhasin, 2012), Saudi Arabia (Karim et al., 2011), and Asian countries (Wickramasinghe and Wickramasinghe, 2012; Perera et al., 2010; Nordin et al., 2010; Wong et al., 2009; Rose et al., 2011; Ferdousi, 2009; Yang and Yu Yu, 2010; Rahman, 2010; Wong, 2007).

However, in some parts of the world, such as Kuwait, the term “lean” is still relatively unheard of. Indeed, according to Tannock and Ahmed (2008), very limited resources cover quality management (QM) in the Arab world, and, more precisely, Kuwait. Furthermore, research on implementing LS in Kuwaiti small and medium-sized manufacturing industries (K-SMMIs) is non-existent.

Notwithstanding the popularity of LS; many organisations around the world have faced difficulties in implementing LS. Several researchers (e.g. Balle, 2005; Papadopoulou and Ozbayrak, 2005; Emilliani, 008) have emphasised that despite the huge benefits of LS, there have been a number of failures in LS implementation. According to Vermaak (2010), there is no agreement amongst researchers about the source of failures, which suggests that each country in general, and in each firm in particular, requires some form of customisation with respect to LS in order to cope with it. As Womack and Jones (2003, p. 281) suggest, “the various industrial traditions are very different”; thus, LS implementation problems are different from one place to another.

Despite the complexities of LS, however, the initiative is still applicable to every organisation; Womack and Jones (2003) conclude, based on many case studies, that LS are applicable to different countries, and regardless of the firm’s
activity. However, an organisation that wants to adopt LS must understand key issues of LS such as CSFs, principles, and more importantly recognising the need to adopt LS.

Many researchers (e.g. Nordin et al. 2012; Stone, 2012a; Abrahamsson and Isaksson, 2012), have emphasised that urgency is required in order to drive organisations to implement LS.

LS consists of a number of tools and techniques, and many studies have identified the CSFs for successful lean implementation, understanding of which is vital for the success of LS. But more importantly, organisations need to know exactly what they require and expect from LS, and then choose the tools and techniques that best fit their situation (Balle, 2005); this requires strategic thinking, awareness of lean tools and their benefits, commitment, and relationship-building with external factors such as suppliers and customers. According to Womack et al. (1990, p. 225), “we are convinced that the chances of lean production prevailing depend critically on a wide public understanding of its benefit”.

The objective of LS is to do what the customer is willing to pay for, and via identifying and eliminating wastes from the process. Most of these wastes are attached to human factors, and in order to eliminate them, organisations need to give more respect and empowerment to the human resources in their organisation by promoting favourable working cultures and continuous improvement (CI). Researchers shows that LS is a social technical system that requires huge attention to the human aspect (Shah and Ward, 2007; Shah and Ward, 2003; Poppendieck, 2002; Dibia, 2012); neglecting this will lead to failures in implementing LS (Emiliani and Stec, 2005; Bamber and Dale, 2000; Parks, 2002; Dibia, 2012).

1.2 Background, and the need for this study

Researchers and practitioners have shown that, despite the benefits that LS can offer to organisations, there have been a large number of failed implementations of it (Balle, 2005; Papadopoulou and Ozbayrak, 2005; Emiliani, 2008). These arise from different sources, such as ignorance of lean concepts, CSFs and LS requirements (this ignorance has often arisen as a result of the different perspectives
taken by researchers when considering LS, which has caused confusion regarding LS) (Hines *et al.*, 2004; Wong *et al.*, 2009; Stone, 2012b), and poor external relationships with suppliers and customers (Panizzolo, 1998; Nordin *et al.*, 2010). Other researchers suggest that failure can arise from the cultural differences highlighted during the transition (Herron and Braiden, 2007).

All of these aspects can be attributed to one single cause, which is lack of understanding of the key elements of LS. Knowing the requirements of LS is key before trying to implement it; in other words, the organisation must measure its readiness for LS and try to understand its requirements, which could save them time, effort and money.

There is a lack of in-depth research on lean readiness (LR) and CSFs, especially with respect to the SME context (Anand and Kodali, 2008). As mentioned earlier, in order to minimise the lean failure rate, there is a need to assess the current practices/realities within the organisation to see whether these are supportive of LS, or in need of adaptation in order to cope with LS. In other words, organisations need to assess their readiness and preparedness before implementing LS (Radnor *et al.*, 2006).

How can an organisation measure its LR? Many researchers, such as Radnor *et al.* (2006), have emphasised the need to understand LR before attempting LS; however, there is currently no definitive model to enable an organisation to understand its readiness. This suggests that there is a need for a tool or framework that organisations can adopt prior to lean implementation, and this leads to the primary aim of this study: i.e. to develop an LR measurement framework, and to understand LR within K-SMMIs.

In order to understand how LR can be measured, and then to see if it is applicable to K-SMMIs, it is necessary to understand how Toyota started; this can be done by identifying key issues such as the eight wastes that hinder improvement, and that Toyota has fought to minimise (What are they? Where do they come from? What are the requirements to tackle and get rid of them?). It is also necessary to understand the principles behind lean/TPS, and the requirements for LS, such as the factors that help to initiate LS success and the factors that the organisation must understand before starting LS, as well as the key tools and techniques of LS.
In that sense, an understanding of the situation in Kuwait is required in order to identify the LR level in K-SMMIs. This entails a deep understanding of several issues, such as processes, planning and control, human resources (HR), top management and leadership, customer relations and supplier relations, as well as of the national and organisational culture, management style and other issues. These will be addressed in the following chapters of this study.

Isaa (2007) claimed that many Kuwaiti industries have implemented quality initiatives (QI) such as total quality management (TQM), Six Sigma, and the International Organisation for Standardization’s (ISO’s) certification, ISO 9000. However, there have not been any reports that show the results of those initiatives in Kuwait with regards to seeing if the initiatives have an impact on K-SMMIs, such as enhancing quality, reducing wastes, increasing efficiency, and decreasing cycle time, etc.

The dearth of research on QI in general, and LS in particular, within the Kuwait context leads to the question of why Kuwaiti organisations have not yet started to use LS, despite the widespread use of LS among most developed and developing countries. Although Kuwait is considered a developing county, it has many distinctive features that could enable K-SMMIs to match the progress seen in other countries.

Kuwait has a small population, but its inhabitants are very open to Western cultures; the country also has money and technology, and thus the potential to become one of the most successful countries in the world. However, with regard to LS, it is unclear whether the country has what it takes to make Kuwaiti organisations successful in terms of implementing LS. Thus, in order to identify the LR level within K-SMMIs, it is necessary to understand whether Kuwaiti firms are considering the key aspects required by LS in their business.

Kuwait has a huge amount of wealth, which can enable it to compete with world-class industries; however, it is still lagging behind even the least developed countries. Addressing the reasons for the delay in development of the manufacturing industries could help the Kuwaiti government to solve this issue and consider K-SMMIs as a new source of economic development, especially in light of the benefits
of SMEs, as highlighted by many researchers (Ghobadian and Gallear, 1997; Wang et al., 2007).

Kuwaiti industries are still in the early stages in terms of competing with other world-class industries. Kuwait is considered a newly emerging industrial market. It is one of the smallest but richest countries, with the highest per-capita gross domestic product (GDP) in the world (Burney et al., 2010); this could help the country to compete with top industries around the world. Because of its wealth, Kuwait is highly dependent on international trade and expatriate labour for economic growth; this has led it to ignore SMEs in both service and manufacturing sectors, and these sectors have received little attention from the government to date, with the role of SMEs in the economy considered to be very modest (Rampurwala and Marafi, 2011). According to a report published by the Industrial Bank of Kuwait (2001), and also highlighted by Eltony (2007), the country’s industrial manufacturing sectors contribute only 2.8 per cent to its GDP (excluding the petrochemical and petroleum sectors).

The Kuwaiti economy is largely dependent on the export of natural resources such as gas and oil. These two products make a huge contribution to the national income, which has led the Kuwaiti government to concentrate heavily on these sectors and pay far less attention to the SMEs in both service and manufacturing sectors. This is very risky because Kuwait is still dependent on oil, and the Kuwaiti government will soon face a deficit (Blair, 2009). Thus, it must pay attention to other sectors in order to create diversity.

In the past, the Kuwaiti government has tried to create diversity and boost the non-oil sectors, but has failed to make this a success (Eltony, 2007). QI such as LS, Six Sigma, and TQM could be a key for restructuring and enhancing the role of K-SMMIs and increasing their contribution to the Kuwaiti economy. According to Zairi (1996), Arab organisations can enjoy huge benefits from implementing QI, as it will help them to address their weaknesses, and eventually make them competitive at an international level.

This is why countries like Kuwait need to focus on this initiative to boost this sector and create diversity in the market. Womack and Jones (2003) suggest that LS is a solution for every company around the world, as it gives companies a
competitive edge by which to compete in the global market, via enhancing efficiency and productivity and reducing errors, defects and mistakes. However, applying LS is not an easy task, and many companies around the globe have failed to follow Toyota’s lead (Balle, 2005; Spear and Bowen, 1999).

The literature shows that Kuwait, like other Arab countries, has yet to consider the importance of QI (Tannock and Ahmed, 2008). This can be attributed to a number of reasons, including the country’s high dependency on oil, ignorance towards QI, or feeling that there is no real need for QI in Kuwait. The failure to consider QI could include all of the above. In order to address the issues affecting QI, this study aims to unveil the reasons and to identify K-SMMIs’ readiness towards LS.

1.3 Aims and objectives

This research project aims to consider the general situations of K-SMMIs to identify their readiness for adopting LS, and to identify the factors that are affecting this readiness. The study further aims to examine how the introduction of LS to K-SMMIs could create awareness about the benefits that LS could bring, and help them to improve their businesses.

In order to achieve the aims of this research, the main objectives are outlined as follows:

1. To identify the essential factors required by LS.
2. To investigate the general state of K-SMMIs.
3. To get a clear understanding of current quality and management practices used by K-SMMIs.
4. To develop an LR framework to measure K-SMMIs’ readiness towards LS.
5. To identify and analyse the different barriers and enablers for implementation of LS in K-SMMIs.

1.4 Gaps and motives

This study aims to address the gaps that have been identified in the reviewed literature. The first gap is the development of a measurement framework to enable
the manufacturing industries to measure their readiness prior to the adoption of LS, which will help to reduce the failure rate and enable the organisation to address the LS requirements, and see whether they are willing to adopt LS. If they cannot meet the requirements for LS, they should not try to begin to implement it.

The subject of LS has not been studied within the Kuwaiti context to date, so the second gap is to evaluate the applicability of LS within K-SMMIs by identifying their readiness towards LS, and by shedding light on the external and internal factors that may impede the success of lean within the Kuwaiti context.

1.5 Research questions

In order to achieve the research aims and objectives, the following research questions (RQs) have been formulated:

1. How far are K-SMMIs from a lean system?
2. What factors relating to quality and management practices inhibit K-SMMIs from adopting LS?
3. Why has LS not been practised within K-SMMIs to date?
4. What is the urgency for K-SMMIs to adopt LS?
5. What is the level of awareness of LS within K-SMMIs?
6. What are the potential barriers and enablers for K-SMMIs to adopt LS?

1.6 Research hypotheses

As this study is the first of its kind, it aims to describe K-SMMIs in terms of the quality and management practices deployed by different industries, and to explore which of them has the best foundation for LS. To this end, five hypotheses have been developed by which to evaluate LR in firms who have not yet started LS, and to learn how to distinguish between these firms; i.e. to understand whether ISO 9000-accredited firms have better readiness towards LS compared to non-accredited firms, and learn whether the firm structure (family vs. non family), size and sector affect readiness towards LS.

The quality and management practices have been clustered into six categories (processes; planning and control; HR; top management and leadership; customer
relations; and supplier relations), and these incorporate most of the requirements that represent the foundation of LS, as extracted from the literature review. Some of these requirements include: housekeeping (5s) (Furlan et al., 2011), cellular manufacturing (Monden, 1998), skilled workers for running and leading processes (Saurin et al., 2011), total productive maintenance (Shah and Ward, 2007), documentation (Saurin et al., 2011), production based on pull (Womack and Jones, 2003). Problem solving (Shah and Ward, 2007), benchmarking (Hines et al., 1999), standardised activity (Likert, 2004), customer involvement (Shah and Ward, 2007), customer feedback (Panizzolo, 1998), number of suppliers (Shah and Ward, 2007), supplier involvement (Nordin et al., 2010), involvement and participation (Ichimura et al., 2007), training (Bhasin, 2011), skilled workers (Achanga et al., 2006), visible management (Scherrer-Rathje et al. 2009), knowing workers’ capabilities (Achanga et al., 2006), and job security (Radeka, 2009).

In order to understand the differences in LR amongst K-SMMIs, five hypotheses (H) have been developed, as follows:

- **H1**: There is a significant difference in the quality and management practices used by ISO 9000 firms compared to non-ISO 9000 firms in Kuwait.
- **H2**: Small firms and medium-sized firms in Kuwait differ significantly in terms of their quality and management practices.
- **H3**: Firms in different sectors in Kuwait differ significantly in terms of their quality and management practices.
- **H4**: There is a significant difference in the quality and management practices used by non-family-owned firms compared to family-owned firms in Kuwait.
- **H5**: K-SMMIs are not using quality and management practices to a very significant extent.

### 1.7 Research methodology

In order to answer the research questions, test the hypotheses, and achieve the aims and objectives of this research, following the literature review, mixed methods have been adopted; quantitative (questionnaire and structured observation) and qualitative (case studies, semi-structured interview and observation). A mixed-method design was adopted to avoid the weaknesses of a single method and to
enhance credibility and validity by collecting data from multiple sources; the forms of validity used were triangulation, experts’ panel and pilot testing. Four phases were followed to achieve the aims of this research:

- Phase one: questionnaire (administered to 50 K-SMMIs)
- Phase two: semi-structured interview (27 managers in K-SMMIs) and structured observation (27 K-SMMIs)
- Phase three: two case studies (including interviews with personnel from different levels and structured and unstructured observations)
- Phase four: expert panel (interview with 26 experts)

The four phases will make it possible to answer the RQs and hypotheses and verify the results to ensure the validity and reliability, as well as the robustness, of these findings.

1.8 Expected contribution and originality of the research

The contribution of this study to the body of knowledge on LS is expected to be significant. The contribution of this study can be summarised as follows:

- As far as the author is aware, no LR framework exists in the literature to date, and this LS and LR measurement framework relating to K-SMMIs thus represents a unique effort in the area of LS. This study aims to address this gap by developing an LR framework that can be used by organisations prior to attempting LS, as it contains most of the LS requirements that represent the foundation of LS, as extracted from the literature review.
- Most LS studies have been conducted with reference to organisations that have implemented LS already, and have identified the critical factors based on this fact. Organisations who have not yet started LS and want to implement LS in future have not received much attention; hence, this study will show the LR of non-lean organisations.
- LS has not been covered within the Kuwaiti context, and no studies have been conducted to date regarding K-SMMIs. This study will thus contribute to the body of knowledge with respect to QI within the Kuwaiti context,
which will also reflect the situation in the wider Gulf Cooperation Council (GCC) region.

- Considering the non-existence of LS studies within the Kuwaiti context, this study will add a new dimension by showing the readiness within K-SMMIs towards LS, and identify the factors that are preventing Kuwaiti manufacturing firms from being lean.
- There is a lack of studies regarding LS within the SME context, especially in the Arab world where no studies have considered LS within small and medium sized manufacturing industries (SMMIs). Thus, this study will contribute to the literature on lean in the developing-country context, especially for those in the Arab world, as Arab countries share many similarities in terms of culture and other traits, and the findings of this study can be used as guidance for other Arab countries.
- Finally, due to the diversity of the data collection sources adopted, this study will add new insight regarding the inhibitors faced by K-SMMIs, which may prevent them from implementing LS, and address the source of those inhibitors.

1.9 Implications

This study can serve as a guideline for the Kuwaiti government on the benefits of LS, and the obstacles that can impede the implementation of LS within K-SMMIs. Further, the LR framework can be used for any manufacturing industries, regardless of location, as it incorporates all LS requirements. Furthermore, the findings of this study will provide insight into Arab manufacturing industries in general, and GCC countries in particular, as most of those countries share similar aspects, especially with regard to external factors. Finally, the LR framework can be used as a checklist for managers who want to consider LS in the future, as it will enable them to learn whether their organisation meets the requirements for LS.

1.10 Organisation of the thesis

This study contains seven chapters, as follows:
Chapter one provides an overview of the study, including the motives, the expected contribution and implications, the need for this research, the aims and objectives, the research questions and hypotheses that the research is aiming to address, and most importantly the gaps that this research is aiming to fill.

Chapter two contains a critical review of the literature on areas including: Toyota’s system, LS principles, LS requirements, critical success factors, and the eight wastes associated with LS, as well as their sources, so as to allow an understanding of the key aspects of lean. Lean assessment frameworks and models developed by several researchers have been reviewed and explained, which will help in designing the framework. The chapter also includes a review of LS within SMEs, the characteristics of SMEs, and their weakness and strengths with respect to adopting LS. Furthermore, it contains key issues regarding Kuwaiti industries, the Kuwaiti business environment, and QI within the Kuwaiti context.

Chapter three includes explanations and the rationale behind the development of the LR framework. Each element of the LR framework is explained and highlighted. It also includes an explanation of each category and element, and why they are important for LS.

Chapter four describes the methodology employed to help answer the research questions, by testing the hypotheses to meet the objectives of the study and to fill the identified gaps. It outlines the research philosophy, research approach, choice of methodology, research strategy and finally the techniques and procedures used to conduct the data collection and analysis. Additionally, this chapter justifies the chosen research method by highlighting the key features, weaknesses and strengths of different approaches and methods.

The chapter further explains the process followed to collect the required data, and outlines the reasons behind the choice of certain methods, techniques and approaches. Furthermore, it shows how difficulties faced in obtaining respondents was overcome, and how any potential bias was mitigated. Several tactics have been followed in this study to enhance the validity and reliability of the outcome, such as triangulation, pilot testing and consulting with an expert panel.
Chapter five includes explanations and a presentation of the data collected from the respondents in Kuwait. This includes data from the questionnaire, the semi-structured interviews with 27 managers in K-SMMIs, the observations within the same 27 K-SMMIs, the case studies, and the opinions from the expert panel.

Chapter six contains an in-depth discussion and analysis of the findings in order to understand and compare the findings with those of other researchers to see how the findings of this study agree and/or disagree with other researchers.

Chapter seven provides the conclusion of the study, which includes how the aims of the study have been achieved and how the RQs have been answered, with reference to the methodology. Further, the contribution and implications of the study, and finally recommendations, limitations, and directions for future research, are highlighted.
2.1 Introduction

In this chapter, the literature will be critically reviewed on areas including: Toyota’s system, the principles and requirements of LS, critical success factors, and the eight wastes associated with LS, as well as their sources, to make it possible to understand the key aspects of LS. Lean assessment frameworks and models developed by several researchers have been reviewed and explained, which will help in designing the framework. The chapter also includes a review of LS within SMEs, the characteristics of SMEs, and their weakness and strengths with respect to adopting LS. Furthermore, it contains key issues regarding Kuwaiti industries, the Kuwaiti business environment, and QI within the Kuwaiti context.

2.2 Overview of lean system

In the 1940s, Taiichi Ohno started working on the TPS, or what is now called “lean”. The development if this system took until the 1980s; the main driver for creating this system was Toyota’s desire to be more efficient in its process as the company realised that only a small fraction of efforts and time add value to the end customer, and wished to be more efficient and produce in a continuous flow (Melton, 2005).

According to Brophy (2012), the term “lean” was first used by Massachusetts Institute of Technology (MIT) graduate John Krafcik in 1988; the term “lean” is used because the Toyota system uses less of everything, including capital, human effort, space, etc. (Anvari et al., 2011; Papadopoulou and Ozbayrak 2005).

In the 1990s, James Womack, Daniel Roos, and Daniel Jones published a book called The Machine that Changed the World, which has become the most-used reference for all lean researchers and practitioners. The book outlined the Toyota production system and compared it to the traditional mass method that was being followed by Western companies, showing the huge gap between the Toyota system and companies in the West and thoroughly explaining the process of LS. In 1996,
James Womack and Daniel Jones released a book entitled *Lean Thinking: Banish Waste and Create Wealth in your Organisation*; this explained the core principles of LS, which are specify the value, identify the value stream, create product flow, respond to customer pull, and pursue perfection.

The LS originated on the shop floor at Toyota, the Japanese automotive company (Hines *et al.*, 2004; Ohno, 1988). The philosophy arose from a scarcity of resources and huge competition at both domestic and international levels (Sugimori *et al.*, 1977; Hines *et al.*, 2004). Further, the innovative system is a multidimensional approach that includes many practices and techniques, such as just-in-time (JIT), pull system, Kanban, respect for people, problem solving, quality systems, team working, cellular manufacturing, supplier management, etc. – all of which come together as an integrated system that aims to eliminate all types of wastes and achieve customer satisfaction (Shah and Ward, 2003).

After World War II, Toyota recognised that it had some weaknesses and believed that in order to take competitive advantage it needed to acknowledge a sense of urgency and benchmark its automobiles against leading companies in Europe and America (such as Ford). According to Abdullah (2003), the first and the most important challenges that Toyota faced included a lack of natural resources in Japan, such as shortages of material, finances and human resources, which forced Toyota to import most of its materials and represented disadvantages for Japan as it cost the country a lot compared to America and European countries. In order to overcome this weakness, Toyota believed that it had to focus on producing high-quality, value products (by eliminating wastes) at minimum cost in order to compete with other countries (Sugimori *et al.*, 1977). It was this urgency that forced Toyota to think outside the box, and this represents the stimulus that drove the development of LS.

Prior to the implementation of LS, Toyota assessed its strong points and found that it offered great value that was not available elsewhere; this was one of the key features that allowed Toyota to start LS. The concept comes from Japanese culture, which emphasises a consciousness and attitude that differs from that in America and European countries. Japanese’ traits include:
1. A group consciousness, or a sense of equality, desire to improve, and diligence born from a long history of a homogeneous race;
2. A high degree of ability resulting from higher education, brought about by a desire to improve; and
3. A daily living centred around work.

These traits are reflected in the organisational culture of Toyota, and are reflected in aspects such as its lifetime employment policy, labour union, lack of discrimination between workers of different levels, great unity between workers and organisations, and the fact that workers within Toyota have the chance to be promoted to managerial positions (Sugimori et al., 1977).

Thus, Toyota recognised its potential to improve and realised that it had the right culture through which to do so, and, most importantly, that it had capable staff that it encouraged to work to their full capabilities and potential to help the company implement new ideas and achieve its goals. Toyota also recognised that empowering people and allowing them to participate in running and improving their own workplace could lead them to triumph in other regions (Europe and America) that lacked these distinctive characteristics (Sugimori et al., 1977, p. 553). As explained by Womack et al. (1990), after LS became a proven success in Toyota, companies around the world began to try and emulate the system on the shop floor, however they struggled due to difficulties relating to changing their culture and mindset in order to support the system.

Toyota’s success in turn led many companies around the world to pay attention to LS and attempt to imitate it (Liker and Hoseus, 2010; Stone, 2012a). However, not all of these attempts have been successful (Balle, 2005; Emiliani, 2008). There are a number of different reasons for these failures, such as ignorance of lean concepts, CSFs and LS requirements; this ignorance has often arisen as a result of the different perspectives taken by researchers when considering LS, which has caused confusion regarding LS (Hines et al., 2004; Wong et al., 2009; Stone, 2012b). Thus, it is important to understand the meaning of LS and how different researchers have viewed it.
2.3 Definition of lean

Lean philosophy has been accepted and applied successfully by many manufacturers (Poppendieck, 2002). There is no concise definition for LS, as many researchers have commented and explained the term from their own point of view (Wong et al., 2009), which sometimes causes problems relating to understanding it. According to Stone (2012b), different explanations and interpretations of LS have resulted in the development of different approaches, giving rise to confusion in terms of understanding the exact meaning of lean and how it should be implemented. Table 1 shows the different perceptions of LS proposed by various authors.
Understanding the definition of lean is important as a first step. According to Womack and Jones (2003, p. 15), lean thinking:

Provides a way to do more and more with less and less human effort, less equipment, less time, and less space […] provides customers with exactly what they want, [and also offers] a way to make work more satisfying by providing immediate feedback on efforts to convert muda [waste] into value.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Perception on the essential component of lean philosophy</th>
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<tr>
<td>Sugimori et al. (1977); Ohno and Kumagai (1980)</td>
<td>JIT, respect for human systems</td>
</tr>
<tr>
<td>Monden (1981)</td>
<td>JIT</td>
</tr>
<tr>
<td>Ohno (1988)</td>
<td>JIT, respect for people</td>
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<tr>
<td>Womack et al. (1990)</td>
<td>Leadership, teamwork, communication, efficient use of resources, continuous improvement, supplier management, customer management</td>
</tr>
<tr>
<td>Womack and Jones (1996)</td>
<td>Value, efficient value stream flow, customer pull system, pursuit of perfection</td>
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<tr>
<td>Shah and Ward (2003)</td>
<td>JIT, TQM, total productive maintenance (TPM) and human resource management (HRM)</td>
</tr>
<tr>
<td>Fullerton (2003)</td>
<td>JIT, TQM and cellular manufacturing</td>
</tr>
<tr>
<td>Liker (2004)</td>
<td>Long-term philosophy, excellent process flow, pull system, quality, employee empowerment, continuous improvement, culture, visual control, respect for people (including suppliers), leadership, teams, continuous learning</td>
</tr>
<tr>
<td>Schonberger (2007)</td>
<td>Employee involvement, quality, JIT</td>
</tr>
<tr>
<td>Holweg (2007)</td>
<td>Leadership, clear vision</td>
</tr>
<tr>
<td>Liker (2008)</td>
<td>Culture, continuous improvement</td>
</tr>
</tbody>
</table>
Other definitions for LS have appeared in the research literature as well. Among these, LS can be defined as a set of processes that add or create value by removing unnecessary work and preventing future wastes (Emiliani, 1998). Stone (2012a) defines lean as a system for identifying and eliminating wastes that affect productivity. Atkinson (2010, p. 36) explained lean as:

A commitment, a process of continuous improvement that can significantly impact an organisation’s competitiveness. Lean is a strategic tool for resolving severe organisational problems and can unite several change initiatives that are running currently in a business.

According to Taj (2005), LS means the organisation must manufacture without generating wastes during processes, while wastes are anything that add no value to the end customer (Womack and Jones, 2003). Anvari et al. (2011, p. 1588) explained “Lean is about controlling the resources in accordance with the customers’ needs and to reduce unnecessary wastes”. According to Sun (2011, p. 160), the Lean Aerospace Initiative (2002) defined LS as:

The dynamic, knowledge-driven, and customer-focused process through which all people in a defined enterprise continuously eliminate waste with the goal of creating value.

Shah and Ward (2003) suggested that LS is an integrated system consisting of different elements combined together, and involving a variety of management practices such as teamwork, JIT, cellular manufacturing and quality systems. LS as defined by Liker and Wu (2000) is a manufacturing philosophy that focuses on delivering the final product to customers on time, at the lowest cost and highest quality.

Wong et al. (2009) described LS as a process that can offer high value to the customer by eliminating wastes from the process and from the human design element. Hayes and Pisano (1994) defined LS as a process that uses less or a minimum of everything to produce a final product, while requiring involvement from all organisational departments.

According to Papadopoulou and Ozbayrak (2005), MIT defined LS as aiming to eliminate wastes in a production area, including wastes regarding customer
relations, product design, management and suppliers, wherein the main objective is to provide the customer with a good-quality product at minimum cost by using less of everything, including inventory, human effort, lead time to develop the product, and space.

Upadhye et al. (2010a) defined LS as an approach that requires multi-skilled workers and high flexible machines that will drive the organisation towards producing a high variety of products with less lead time, at a competitive price, and that ensure customer satisfaction. Finally, Drew et al. (2004, p. 6) defined LS as:

An integrated set of principles, practices, tools and techniques designed to address the root cause of operational underperformance. It is a systematic approach to eliminating the sources of loss from entire value stream in order to close the gap between actual performance and requirements of customers and shareholders […] lean tries to eliminate three key sources of loss from operating system, not only waste but also variability and inflexibility.

It can be concluded that LS can be explained with reference to all of the above definitions, depending on where it is needed and what is need from it within the specific organisation in question. All of the above-mentioned definitions are consistent with Toyota’s main principles, since Toyota developed a flexible culture that focuses on pursuing perfection through eliminating all forms of wastes, by focusing solely on responding to customer demands (Vermaak, 2010).

2.4 Benefit of LS

[LS] is a powerful tool designed to meet recent manufacturing enterprises' challenges in reducing lead-time, human errors, cost, and delivery times while increasing the quality of the final product and continuous flow in the manufacturing process (Ichimura, 2008, p. 31).

Knowing the benefits of lean practices can create a more in-depth understanding of them within an organisation. By adopting LS, an organisation can improve customer responsiveness and quality, and reduce cycle time (Spann et al., 1999). Increasing levels of customer satisfaction, financial savings and knowledge management, and reducing inventories and process wastes, are some of the benefits suggested by Melton (2005). There are many other benefits relating to the adoption
of LS; it can complement human efforts, create manufacturing space and improve quality (Zayko et al., 1997). According to Monden (1983), LS can play a great role towards the improvement of production activities, not only in automobile industries but also in other types of industries if it is adapted.

According to Bergmiller and McCright (2009), LS can help to increase efficiency, reduce customer response time, cut costs, improve profitability and enhance the organisation’s image. Moreover, LS can lead to sustainable development by increasing customer satisfaction and communication, and reducing cost and delivery time, as it is a systematic approach that helps managers to identify wastes and omit them from the organisation at every stage in the operation, which will lead to better organisational performance and make the company waste-free (Upadhye et al., 2010a).

However, these benefits cannot be achieved unless the organisation addresses the important issues involved in LS. However, before going through the individual requirements, principles and CSFs for LS, there is a need to understand the eight wastes that are associated with LS so that the organisation can measure them and learn where they are coming from.

2.5 Eight wastes associated with LS

The main objective of LS is to eradicate and eliminate wastes from within the organisation that add no value to the end customer (Womack and Jones, 2003; Benson and Kulkarni, 2011). Knowing the source of wastes and the consequences of those wastes are very important, and this knowledge represents the first step to tackling them.

According to Benson and Kulkarni (2011, p. 1), “the most effective way to reduce cost while keeping up with the competition is to become lean by reducing, and preferably eliminating, waste”.

Womack and Jones (2003) believe that any activity that does not create value is considered waste in an LS, while value should be defined based on the customer perspective; in other words every step, movement or activity that the customer is not willing to pay for is considered waste, and the organisation must therefore remove it.
However, although the concentration in LS is totally on the value added activity that the customer is ready to pay for, several activities are required to produce the product; these are called “essential non-value-added activities”. Moreover, there are some activities that are considered “non-value-added activities”; these do not add value to either the customer or the product, but the organisation should not remove them as they are required by rules and regulations (Benson and Kulkarni, 2011).

Thus, there are three types of value: valued added, essential non-value added and non-value added activity. In order to be lean, the organisation needs to differentiate between these activities and try to eliminate all non-value-added activity that does not add value to the product or to the customer, and is not required by rules and regulations (Benson and Kulkarni, 2011; Ferdousi and Ahmed, 2010).

The prime objective of LS is to identify the non-value-added activities and eventually eliminate them, and to minimise the essential non-value-added activities (Benson and Kulkarni, 2011). Moreover, LS involves trying to shorten lead times and cycle times, and improve overall organisational performance – and this can only happen by eliminating wastes (Ferdousi and Ahmed, 2010).

There are eight types of LS wastes that have appeared in lean literature, namely: defects; overproduction; waiting; wasted talent; transport; inventory; motion; and over-processing (Benson and Kulkarni, 2011; George, 2003; Womack and Jones, 2003; Kilpatrick, 2003; Stack, 2012). According to Ohno (1988), these wastes have accounted for 95 per cent of costs in non-lean manufacturing environments. Thus, keeping wastes within the organisation will have a huge negative impact on cost, delivery and quality, and will prevent the organisation from being lean, while elimination of these wastes will result in higher levels of customer satisfaction, profitability, throughput and efficiency (George, 2003).

Benson and Kulkarni (2011) explained that regardless of type, all eight wastes will contribute negatively to the productivity, profitability and flexibility of the process; in addition, not all wastes can be easily recognised, as some contribute to value-added activities, and one type of waste could lead to other wastes (for example, overproduction leads to inventory waste). As LS aims for perfection, even value-added activities can be improved.
As explained by George (2003), the causes of these wastes are from different sources and areas in the organisation such as:

- Poor layout
- Long set-up times
- Poor workplace
- Nonexistence of equipment maintenance
- Absence or lack of training
- Use of improper methods
- Vague procedures, instructions and information
- Lack of proper planning
- Supplier problems in terms of delivery and quality
- Inaccurate gauges
- Poor working condition (cleanliness, mass, heat, etc.)

In order to eliminate the eight wastes, the organisation must first understand where the wastes are coming from. The following section provides an explanation of the sources of waste, and the effects if they are not fixed and removed.

### 2.5.1 Defects

This type of waste is the most prominent for any business, and most companies are likely to face it. It can be identified easily from anywhere in the firm, from process to management level, and can be seen in non-compliant products or damaged goods (Benson and Kulkarni, 2011). The source of this type of waste comes from a lack of: preventive maintenance, standards, inventory control, design, documentation, quality control, documentation of changes made, awareness of customer needs, or proper inventory control (Stack, 2012).

Ignoring this type of waste could cost the firm dearly by causing delays in processes, discarded defective items, extra work for staff, and delays to shipments to the end customer (Ferdousi and Ahmed, 2010).

To eradicate this type of waste, firms need to have countermeasure activities in place. This requires: standardising work, activities and changes; ensuring rigorous
quality control; being fully aware of work requirements and customer needs; and providing workers with a checklist to simplify the work (Stack, 2012).

2.5.2 Overproduction

One of lean principles is “pull”, wherein firms need to produce based on customer demand so that overproduction cannot occur. Anything extra, such as safety stock, buffers, or work in progress (WIP) inventories, is considered waste in terms of time, labour and material resources which may be used more effectively in other departments (Kilpatrick, 2003). Stack (2012) outlined the sources that cause overproduction to include: producing products that exceed requirements; unawareness of customer demands and needs; producing based on forecasting, rather than actual demands; long set-up times; producing to make the most of machines and keep the finished product on shelves; and poor automation.

The effect of this type of waste can be seen as increasing inventory level, which eventually leads to high cost (Ferdousi and Ahmed, 2010). Producing more than needed is a very common practice, as firms usually like to keep safety stock; however, this can be risky as customer demands can change and there is also a risk that the products will remain in stock for a long time, which could affect quality. Moreover, it adds extra works for staff in terms of transportation and inventory, as well as WIP (Benson and Kulkarni, 2011).

Stack (2012) recommended that in order for an organisation to avoid overproduction they need to: establish a clear and well-established procedure to follow for every process at all levels, and create a workflow that will add value to customers, whether internal or external.

2.5.3 Waiting

According to Kilpatrick (2003), a number of factors could lead to this type of waste, such as waiting for material, equipment, information, tools, etc. All of these are considered wastes in LS, as LS requires producing in flow and on a JIT basis. Stack (2012) showed that this waste could arise from: poor communication; poor layout; long set-up times; inadequate staff; incompatible production rate; and work
absence. Benson and Kulkarni (2011) added that this type of waste could be due to a lack of planning and scheduling, which will contribute to mismatching between workers and other departments.

This waste will lead to longer lead times and poor flow, as well as a waste of time for the company (by not getting the best from its workers) (Ferdousi and Ahmed, 2010). This will result is the firm’s losing money as they must pay workers even when they are doing nothing due to delays from other sources (e.g. waiting for material, information or equipment to become available) (Benson and Kulkarni, 2011).

Stack (2012) recommended several steps to eliminate waiting waste: if there is a shortage of staff the company must provide an adequate number of workers to help smooth out the workload; people at lower levels should be empowered to make decisions when needed, rather than waiting for information and instruction to come from the upper level; adequate quality controls should be in place to ensure the reliability of machines and systems; workers should be encouraged to multitask so that an absence of other workers can be compensated for; and good supply control should be provided so that staff have the materials or equipment they need.

2.5.4 Wasted talent

Not fully utilising creativity, skills and talent is an important aspect that companies need to pay attention to. This type of waste can arise when a company assigns overqualified persons for less demanding jobs (according to George (2003), this means that the company is not using employees’ mental creativity, experience or skills, which is considered waste), or pays for training that adds no value to the current process (Benson and Kulkarni, 2011). Although the assessment of talent is sometimes a tedious job, companies who understand their people’s capabilities can do more with less. Thus, the most important thing is to understand people’s potential and make the most of their skillset by asking for suggestions and ideas to improve the process (Benson and Kulkarni, 2011).

Failure to address this issue could affect organisational performance and productivity; this waste is particularly crucial for the organisation, as it may lead to
all types of waste if not addressed properly and carefully (Stack, 2012; Benson and Kulkarni, 2011).

The causes of this waste come from sources such as: poor workflow; inadequate hiring practices; poor or lack of training; and high employee turnover (Kilpatrick, 2003). To this list, Stack (2012) added poor communication and teamwork; poor top management; lack of involvement in problem solving; and lack of job description, which will result in worker confusion and, ultimately, wasted talent.

In order to eradicate this waste from the organisation, Stack (2012) suggested that the top management must empower people and avoid micromanaging them; treat expert people as experts of the system and try to get the best of them; and involve people, especially experts.

2.5.5 Transport

Raw materials and finished products should be delivered to the point of use, rather than going from place to place which adds no value to the customer in LS. This technique is known as point-of-use storage (POUS) (Kilpatrick, 2003).

Excessive transportation adds cost to the organisation, and wastes time as well as affecting product quality (Ferdousi and Ahmed, 2010). The causes of this waste come from: poor layout; poor system design; misaligned process flow; and unnecessary handling and steps in the system (Stack, 2012; Benson and Kulkarni, 2011).

To get rid of this waste, organisations need to: simplify the process; fix or amend plant layout to help smooth out the process; handle products only when needed; and try to make distances between each stage as short as possible (Stack, 2012).

2.5.6 Inventory

This waste arises as a result of overproduction. It can have a negative impact on the organisation in terms of: affecting cash flow; using valuable space; increasing
product lead time; and adding extra work, such as making sure that finished goods or raw materials are in good shape, which involves employees receiving, inspecting and moving them, which in turn adds extra cost and moreover might need extra care as some items require certain conditions to avoid affecting their quality (Kilpatrick, 2003; Benson and Kulkarni, 2011).

For most companies, excessive inventory is due to uncertainties in terms of customer demands, or a desire to cover variability in the process (Benson and Kulkarni, 2011). The main sources are: overproduction; unawareness of customer needs; unreliable suppliers; mismatches in production speeds; and long set-up times (Stack, 2012).

The organisation can overcome and reduce inventory wastes by applying JIT and producing only according to direct customer orders (Stack, 2012). Benson and Kulkarni (2011) suggested that organisations must orders raw material when they are needed and that finished goods should be sent directly to the target customer.

### 2.5.7 Motion

This type of waste occurs when there is poor workflow; bad layout; bad housekeeping lack of documentation of work method; lack of standards; poor process design and control; and shared tools, equipment and machines (Kilpatrick, 2003; Stack, 2012).

Benson and Kulkarni (2011) suggested that in order to maximise productivity, workers and operators must wait until the required parts arrive so they can avoid unnecessary movement; however, this is not always easy to do. However, the organisation can reduce motion that adds no value to processes or to the product itself by: improving the workstation layout (for example implementing a U-shaped layout); ensuring tools, parts and materials are available when needed, in an obvious place; standardising files, equipment, and work procedures; ensuring an organised workplace; and keeping everything clean and tidy (Benson and Kulkarni, 2011; Stack, 2012).
2.5.8 Overprocessing

Kilpatrick (2003) showed some common examples of overprocessing waste, and suggested that it occurs when organisations rework or inspect products when they should be right first time. Ferdousi and Ahmed (2010) said that using incorrect procedures, processes or tools in a process leads to overprocessing waste, which add no value to end customers.

Benson and Kulkarni (2011) added that most organisations have some kind of overprocessing waste as they want to be safe and product excess products as a precautionary measure. According to George (2003, p. 30), “extra effort that adds no value to the product (or service) from the customer’s point of view” is considered a waste in LS.

Other forms of over-processing wastes can include producing incorrect products, and unnecessary documentation and over-inspection of products. This type of waste has many negative effects on the firm’s performance in terms of increased cycle time and impacts on the inventory level.

2.6 Lean principles

For any organisation that wants to implement LS, regardless of its sector, activities and size, it must understand several things, such as what LS is, how the organisation can benefit from LS, what type of wastes LS aims to remove, and, more importantly, the lean principles.

The sections below will shed light on the lean principles that must be fully understood prior to attempting to implement LS. According to Womack and Jones (2003), there are five principles of LS: specify value; identify the value stream; create flow; respond to customer pull; and finally pursue perfection (Table 2). These principles can only work successfully if there is a culture of empowerment and trust within the organisation, rather than a command and control culture (Jones et al., 1999). Oppenheim et al. (2011) claimed that lean thinking is all about understanding value and waste and how to create value without waste; and this can only be achieved by applying the lean principles. In conclusion, lean principles aim to prevent and eliminate the eight wastes.
The most important thing to understand with relation to the principles of LS is not to imitate tools by copying and pasting them in different working areas – there is a need to understand the requirements behind the principles in order to achieve the best results. Thus, LS needs to be understood as a socio-technical system, rather than a bunch of tools (Lander and Liker, 2007), as it consists of two aspects: technical (for example JIT and Jidoka), and social, which requires the organisation to use the full capabilities of its workers (Sugimori et al., 1977).


Instead of trying to implement kanban [card signal], heijunka [level Scheduling], 5s [sort, set in order, shine, standardise, and sustain], and poke-yoke [error- or mistake-proofing], the idea is to design a comprehensive system that satisfies the principles [...] By understanding Toyota’s system at a principles level we can make the right choices to ensure that the tools implemented fit the organization and support its people while achieving the objectives they were designed for.

For example, one of the main principles of LS is to create “flow”, which can be achieved by moving information and materials quickly and by linking people and processes (Lander and Liker, 2007). Thus, creating flow does not force the organisation to go for a specific shape or layout, because every organisation has different needs, and flow may be achieved by implementing a “U-shape” layout, by following the first-in-first-out approach, or by simply improving communication. Organisations can therefore create flow by different means; the most important thing is to understand the exact meaning of lean principles and then identify the most suitable way to implement them (Lander and Liker, 2007).

This leads to a promotion of the concept of the learning organisation (another distinctive feature of Toyota), as the company aims to improve based on input from employees, and can easily improve its ways of doing things and thereby eliminate wastes and enhance productivity. For instance, Toyota sees its principles as a philosophy, rather than as a set of rigid tools; changes in the work routine to improve performance has been described as the trademark of Toyota (Fujimoto, 1999). According to Lander and Liker (2007, p. 3697), any organisation that wants to emulate Toyota needs to have three ingredients: “continuously improving, constantly learning, and relentlessly learning to learn”.

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Table 2 Five lean principles

<table>
<thead>
<tr>
<th>Lean principle</th>
<th>Definition</th>
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<tbody>
<tr>
<td><strong>Value</strong></td>
<td>“capability provided to customer at the right time at an appropriate price, as defined in each case by the customer” (Womack and Jones, 1996, p. 311)</td>
</tr>
<tr>
<td><strong>Value stream</strong></td>
<td>“specific activities required to design, order, and provide a specific product, from concept to launch, order to delivery, and raw materials into the hands of the customer” (Womack and Jones, 1996, p. 311)</td>
</tr>
<tr>
<td><strong>Flow</strong></td>
<td>“progressive achievement of tasks along the value stream so that a product proceeds from design to launch, order to delivery and raw materials into the hands of the customer with no stoppages, scrap or backflows” (Womack and Jones, 1996, p. 306)</td>
</tr>
<tr>
<td><strong>Pull</strong></td>
<td>“system of cascading production and delivery instructions from downstream to upstream in which nothing is produced by the upstream supplier until the downstream customer signals a need” (Womack and Jones, 1996, p. 309)</td>
</tr>
<tr>
<td><strong>Perfection</strong></td>
<td>“complete elimination of muda [wastes] so that all activities along a value stream create value” (Womack and Jones, 1996, p. 308)</td>
</tr>
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</table>

2.6.1 **First principle: Specify value**

Specifying value is the most crucial point in LS; in addition, “value can only be defined by the ultimate customer” (Womack and Jones, 2003, p. 16). Thus, in order to define value correctly, the organisation needs to be fully aware of its customers in terms of their demand and needs; customers are either internal, and thus waiting for the next process, or external, and thus waiting to pay for the product (Liker, 2004).

Failure to correctly specify value will lead to wastes that, sooner or later, will cost the organisation dearly. The common mistake for most organisations is to produce products using already purchased machines, without real orders from customers; if the customer does not respond the company will decrease the price and try to sell the product again. According to Womack and Jones (2003), LS helps to avoid this common mistake by specifying the value that the customer is willing to pay for.
Lean [system] must start with a conscious attempt to precisely define value in terms of specific product with specific capabilities offered at specific prices through a dialogue with customers (Womack and Jones, 2003, p. 19).

This step is crucial, as it will help the organisation to focus on what adds value to its customers so that it can move on to the next step, “identification of the value stream”.

### 2.6.2 Second principle: Identify the value stream

Identification of all the activities needed to produce a service or product, and removing the non-value-added activity, can be done through mapping three main tasks: problem solving (from concept to detailed design, engineering and launching the product); information management (from taking orders to scheduling and delivery); and finally physical transformation (from the raw materials to the end customers) (Womack and Jones, 2003). By mapping the value stream of the product or family of products, the organisation will be able to expose the non-value-added activities that are occurring and creating waste.

Once again, this step is very important as it will allow the organisation to see the process from start to finish, which in turns will make the non-value-added activities visible so that they can be removed. The company can then move on to the third step, “creating flow”.

### 2.6.3 Third principle: Create flow

This step occurs after the company specifies the value from the customer standpoint, maps the value stream for the products, and eliminates the unnecessary steps (Womack and Jones, 2003). The aim of LS is to make products follow a continuous flow from the raw material to the end customer (Rother and Harris, 2001).

In order to achieve this, Womack and Jones (2003) suggested that firms must: focus on the whole value stream from raw material to end customer; remove obstructions to the continuous flow from each department; and apply specific work practices and tools to eradicate backflows that cause stoppages.
All areas within the organisation, such as design, order taking, production, and distribution, need to participate in creating the flow (Womack and Jones, 2003), otherwise there will be no benefit to having one department producing products in a continuous flow and other departments that do not, and the whole process will be ruined. According to Oppenheim et al. (2011, p. 33), flow means that the organisation needs to “work through the planned and streamlined value-adding steps and processes, without stopping or idle time, unplanned rework, or backflow”. Certain tools in LS serve to enhance the flow, such as 5s, visual control (VS), standardisation and status indicators (Womack and Jones, 2003).

This step should come after the first two steps, since by that time the organisation will have specified the value, plotted the value stream and identified the wastes; in this step, the organisation can identify and remove the non-value-adding activities, ready for the fourth step: “responding to customer pull”.

2.6.4 Fourth principle: Respond to customer pull

Hopp and Spearman (2004, p. 13) defined a pull system as one that:

Explicitly limits the amount of work in process that can be in the system. By default, this implies that a push production system is one that has no explicit limit on the amount of work in process that can be in the system.

Pull is epitomised as a lean principle, and more precisely JIT, as it means only producing what customers have asked for (which could be raw materials or products). Having a pull system in place will decrease inventory levels and allow the organisation to know exactly what the customers are willing to pay for, avoid the need to produce products based on forecasting, which may lead to products ending up on the shelf for very long time (Womack and Jones, 2003), and save human effort and improve staff schedules (Oppenheim et al., 2011). Moreover, pull systems allow the organisation to have less inventory and WIP, which are considered two forms of LS wastes, and thus smooth out the production flow (Hopp and Spearman, 2004).

After creating flow, the organisation can manage the pull system as it will have acknowledged the value and identified and removed the associated wastes.
2.6.5 **Fifth principle: Pursue perfection**

Once the organisation has successfully specified value, identified the whole value stream, achieved a continuous flow, and let the customers pull their products, they have to pursue perfection by combining the previous four principles with each other (continuous flow is not possible if there is waste; nor is pull if there is no flow; and so on). This means that there will always be some form waste between each step, and again perfection is a core concept of lean thinking as it urges the organisation to strive for CI (Womack and Jones, 2003).

Having explained the meaning of each element of LS principles, it can be said that each element of LS requires:

- **Customer relationships:** all departments within the organisation are working for customers, so they all need to understand the customers’ needs and requirements
- **Supplier relationships:** successes in terms of flow and pull are not possible if there is a delay in raw material or poor-quality raw material, which will affect the whole process
- **Skilled and multitasking people:** this is necessary in order to be able to specify value, map the value stream, and solve problems
- **Empowerment and training:** this promotes flow and pull
- **Good layout:** poor layout will lead to difficulties in creating flow, which will lead to wastes
- **Efficient management and leadership:** these are needed to promote the implementation as they need to assign people to the right tasks, empower people, invest in training, and create strategies and vision to promote lean culture.

In a nutshell, by following the five principles of LS the organisation will be able to eliminate waste and create value for customers; moreover, it will be able to analyse its processes and seek perfection on a continuous basis, which will eventually help the organisation to sustain LS.
2.7  Lean tools (lean building blocks)

LS offers the organisation a set of tools and techniques that can be used to help achieve the objectives of LS – i.e. eliminate the eight wastes and create value. These tools and techniques are consistent with the main LS pillars, which promote respect for people and continuous improvement (CI), and with the five LS principles (value, value stream, flow, pull and perfection). In other words, by implementing these tools the organisation should be able to follow the five principles effectively and achieve the LS pillars. According to Karim et al. (2013) the choice of tools is highly dependent on the manufacturing process; the organisation needs to understand what it must achieve from LS, and assess its processes before using the tools, in order to avoid failure.

According to Pojasek (2003), LS building blocks have been explained by many authors and consultants, so there is some degree of difference in terms of what to include in them. However, some tools have been used in many authors’ research (e.g. Kilpatrick 2003; Ferdousi and Ahmed, 2010; Pojasek, 2003). According to Emiliani and Stec (2005, p. 372), the aim of these tools is to:

- simplify work and the workplace, improve quality, reduce lead-time, and focus people on performing only those activities that create value. Importantly, they also help people realize their full potential and actualize innate desires to make positive contributions to the workplace.

The tools below are the most commonly used in the literature, and will enable the organisation to eliminate wastes and create value.

2.7.1 5S

This relates to visual housekeeping and is the first step of the lean journey (foundation of LS), as it helps to bring focus to the shop floor to formulate standardised work procedures that will help in controlling the workplace. 5s is considered to be the basis of LS as many lean tools, such as visual management, TPM and standard works cannot be implemented without it; these tools are essential for removing wastes and creating flow, as well as helping to create a pull system.
The benefits of 5s include improving productivity, reducing wastes and enhancing variation.

5s consists of five activities namely: sort (Seiri), set in order or simplify (Seiton), shine (Seiso), standardise (Seiketsu), and sustain (Shitsuke) (Bicheno and Holweg, 2009).

- Sort focuses on removing items from the workplace that are not needed for current production operations (Bayo-Moriones et al., 2010).
- Set in order is about placing machines, tools, and storage shelves to reduce the waste of motion. It focuses on creating efficient and effective storage methods to arrange items so that they are easy to use, and to label them so they are easy to find and put away (Bayo-Moriones et al., 2010).
- Shine (and inspect) is about cleaning up the storage areas, equipment and surrounding areas to sustain this improvement (Bayo-Moriones et al., 2010).
- Standardise is about putting in place simple, clear and visual standards for easier visual management – in other words to standardise best practices in the workplace (Bayo-Moriones et al., 2010).
- Sustain involves making a habit of properly maintaining correct procedures, and is often the most difficult step to implement and achieve (Bayo-Moriones et al., 2010).

2.7.2 Just-in-time (JIT)

JIT is a pull system, which means production only occurs when customers initiate demand. This helps to reduce inventory level and increase competitive advantage in the marketplace by increasing productivity (Gunasekaran et al., 2000).

2.7.3 Total productive maintenance (TPM)

The idea of TPM is to carry out maintenance on a regular basis to avoid any malfunction or machine breakdown. By following TPM, the focus of the organisation will be changed from “fixing” to “preventing” equipment faults, which will save time and money for the organisation. According to Spear and Bowen (1999), Toyota used TPM as a countermeasures system, rather than to react to
problems. The reliability of equipment is very important to keep the flow going (Abdullah, 2003).

This technique requires participation and contribution from everyone within the organisation; the key element of TPM is that each worker is responsible for maintaining their own machine and equipment (Nakajima, 1988), so empowerment is highly necessary (Ferdousi and Ahmed, 2010).

According to (Duffuaa et al., 1999), TPM is a management approach that requires participation from all employees to maintain and ensure the productivity of the equipment. The objectives of TPM are to:

- Improve overall equipment effectiveness (OEE) in terms of time availability, performance efficiency and quality rate.
- Take a systematic approach to reliability, maintainability, and life cycle cost.
- Involve operations, materials management, maintenance, engineering, and administration staff in equipment management.
- Engage management and workers from all levels to enhance equipment performance through small group activities and team performance.

TPM is an essential part of maintaining the flow and pull system. Via successful implementation of TPM the organisation can enjoy several benefits, such as improving the consistency, reliability and the capacity of machines (Duffuaa et al., 1999; Bhasin and Burcher, 2006).

2.7.4 Value Stream Map (VSM)

VSM is one of the most powerful lean tools for reducing and eliminating wastes. It focuses on the process of product flow to the customer, and helps to analyse and identify waste from non-value-added activities within the process, get rid of them by looking at the current state as described by a map of the product flow, and improve the process by establishing a future state map. It requires close monitoring of the activities that are involved, ultimately, in delivering the service or the final product to the end customer (Garbie, 2010).
The process happens by understanding what adds value to the customer; in other words, what the customer is willing to pay for. By understanding customer needs, the organisation can use VSM to identify the value-added, essential non-value-added and non-value-added activity.

However, despite the benefits of VSM it has some limitations and shortcomings, as different researchers have explained. For example, according to Woehrle and Abou-Shady (2010), VSM has several limitations that inhibits it application within a wider perspective. McDonald et al. (2002) explained that VSM is not always useful, especially when it is applied in a production line that has different product families and processes, and different set-up times. Lian and Van Landeghem (2007) highlighted that VSM is time consuming and incapable of dealing with the detailed dynamic behaviour of production processes, nor of incorporating their complexity. Gurumurthy and Kodali (2011) explained that VSM is static, as it can only capture a snapshot of the shop floor; they further explained that working on the shop floor is not static, and can change from day to day. Thus, conducting VSM alone may not tell the whole story about the real action in the shop-floor.

2.7.5 Kaizen

Kazien is a Japanese term that refers to continuous improvement involving everyone – including managers and workers; it is both a philosophy and a set of tools, as it should include all lean tools to help improve the process (Bicheno and Holweg, 2009). According to Pojasek (2003), Kaizen involves minor adjustments to the process on a continuing basis.

Kaizen is the concept of improving a process by a series of small continuous steps. Often times these improvements are small and hard to measure, however the accumulated effect is significant. (Wilson, 2009, p. 65)

Thus, it helps to continue working to remove all kinds of wastes, which will eventually help the company to achieve flow, pull and perfection. “Lean cannot be sustained unless continuous improvement becomes an integral part of an organisation’s cultural norm” (Radnor et al., 2006, p. 76).
2.7.6 Standardised work

Work should be carried out according to an approved standard in terms of methods used, employee movement and production rate (Takt time, cycle time, work sequence and in-process stock) (Dennis, 2002; George, 2003). Standardisation should be applied to work processes as well as management processes, and involves “creating a precise and commonly understood way to conduct every essential step in every process” (Womack et al., 2007, p. 290). Bicheno and Holweg (2009) explained the key aspects that must be understood in relation to standardisation work:

- Standard work is not static; it should be updated when a better way is found.
- Standard work supports stability and reduces variations since the work is performed exactly the same way each time.
- Standard work is essential for CI by moving from one standard to better standards.

According to Dennis (2002), standardised work will help the organisation to achieve:

- Process stability by having clear stop and start points for each process
- Kaizen
- Better training
- Better audit and problem solving
- Employee involvement
- Poka-yoke (error or mistake proofing)
- Organisational learning

Standardised work is essential to promote CI and enable it to occur. As Taiichi Ohno (cited in Womack et al., 2007, p. 290) suggested, “without standards there can be no Kaizen”.

2.7.7 Visual management (VM) or visual control (VC)

LS aims to make everything visible in the workplace so that it can be found straight away when needed (Ferdousi and Ahmed, 2010); several aspects of
information and activity could be visually managed in order to help the workflow, such as production schedules, backlogs, resource utilisation, inventory level, etc. (Kilpatrick, 2003). All activities should be clearly visible to all workers so that they can understand the process (Pojasek, 2003) at a glance, which will help to achieve CI (Grief, 1991). VM is very important for helping with product flow, and is linked with 5s (Bicheno and Holweg, 2009; Pojasek, 2003).

2.7.8 Cellar design

This refers to the layout being designed according to best possible sequence to help the flow of material, tools, information, raw material, parts etc. The design should be based on one-piece flow (Pojasek, 2003). Thus, all material, tools and information should be placed according to on similar functions in order to increase efficiency and help avoid non-value-added activities (George, 2003). The most appropriate design is to use U-shape cells, which will improve communication between people and enable better utilisation of materials and equipment (Kilpatrick, 2003).

2.7.9 Quick changeover, Single Minutes Exchange of Dies (SMED) and set-up reduction

This aspect refers to flexibility in relation to changing tools and fixtures in order to help with producing multiple products in smaller batches (one of the objectives of LS) that can be run on the same equipment (Pojasek, 2003; George, 2003). This technique allows more frequent changeovers, which in turn will increase production flexibility by allowing smaller batch flows (Kilpatrick, 2003; Bicheno and Holweg, 2009). Thus, it concentrates on reducing production lot sizes and improving the flow by providing a changeover reduction technique form running the current product to shift for the next product (Upadhye et al., 2010a).

2.7.10 Pull system

This technique is highly connected with JIT and batch size. Within a pull system, the supplier only provides material when needed and the organisation only produces what customers have demanded (Kilpatrick, 2003; Womack and Jones,
2003; Pojasek, 2003; George, 2003). It is the opposite of a push system, wherein the product is produced and kept in stock without customer orders (based on the forecasts) (Kilpatrick, 2003; Bicheno and Holweg, 2009).

Kanban is a technique and tool that is connected to pull systems, as it helps to enable process flow. Kanban is used as a signal to indicate material order points in terms of material needed, where the material is ordered from, and where it should be delivered to (Kilpatrick, 2003). In order to implement pull, the organisation must meet two prerequisites: reducing batch sizes and producing fault-free parts (Åhlström, 1998).

2.7.11 Point of use storage (POUS)

All materials, parts, tools, information standards, and procedures should be kept and stored in the place they are most needed (George, 2003; Kilpatrick, 2003). This technique will help to reduce non-value activities such as motion and transport (Kilpatrick, 2003). It is reliant on 5s and VM, since without proper housekeeping POUS will not work.

2.7.12 Batch sized reduction

Batch sized is connected to quick changeover techniques, pull, and cell layout (Åhlström, 1998). The benefit of this tool is that it can reduce the amount of WIP and thus have a positive impact on the cycle time and lead time, which will enable the company to deliver required items to customers when needed.

As explained above, the main objective of LS is to produce what customers want, and batch size reduction can help in this regard. However, LS will not work unless there is CI in house to reduce batch size (Kilpatrick, 2003). Reducing batch size will help to move the product to the next process faster, so that it can be completed quicker and give the organisation better agility in terms of responding to customer demands, which is key in LS. If the organisation is producing products in large batches, on the other hand, it will affect the quality of the product and increase errors, which will lead to overproduction, defects, and waiting wastes, since defects
lead to reproducing products, while smaller batches allow the company to avoid unnecessary steps (Coons, 2007).

2.8 Toyota system

According to Womack et al. (1990), LS is the “Japanese secret weapon” that led Toyota to success and prosperity and stimulated many organisations around the world to try to apply LS within their organisation. Liker and Hoseus (2010) explained that many companies around the world see Toyota as a role model in this regard, while Bicheno et al. (1997) suggested that Toyota has been regarded as a benchmark and an example of best practices for companies who want to adopt LS, and Emiliani (2006) credited Toyota’s success to its creation of LS.

However, most companies who have tried to emulate the Toyota model have failed, due to the fact that they have been ignorant of the internal culture of Toyota (Spear and Bowen, 1999). Liker (2004) and Hino (2005) attributed Toyota’ success to its persistent application of lean principles. Takeuchi et al. (2008, p. 101) stated that:

[Toyota] values include the mindset of continuous improvement (Kaizen); respect for people and their capabilities; teamwork; humility; putting the customer first; and the importance of seeing things first hand (Genchi Genbutsu).

In this regard, it is important to understand the Toyota way of organisational management, and identify the reasons behind its success in order to understand how to create a desirable lean culture in any organisation and to understand the requirements for LS. Understanding the relationships in Toyota among core people (workers, customers and suppliers) is also important. In addition, it is vital to identify what respect for people means in Toyota, in terms of knowing how the leaders lead, how the system works, and finally how Toyota has achieved and sustained its CI’s culture.

According to Emiliani (2008), few successful LS transformations have been witnessed in the past years due to this lack of understanding about LS as a philosophy, since it is often viewed purely as a manufacturing system. More
importantly, most companies have failed to successfully implement LS because they have not understood the concept of value and respect for people as Toyota does.

Schein (1992) emphasised that organisations’ leaders need to focus on the core of the organisation, which is its basic underlying assumptions. Without addressing these assumptions, the organisation is unlikely to change or maintain its culture (Young, 2000). Thus, studying “the Toyota way” is key to enabling the organisation to be aware of the requirements for adopting LS.

Liker (2004) explained that the underlying assumptions of Toyota’s culture are reliant upon two parts: the first is external, and thus starts with customers, and the second is internal, and thus starts with respecting people and striving for a continuous improvement in internal culture. Ohno (1988, p. ix) described Toyota’s culture as follows:

All we are doing [in Toyota] is looking at the timeline from the moment the customer gives us an order to the point that we collect the cash. And we are reducing that timeline by removing the non-value-added wastes.

According to Liker and Hoseus (2010), Toyota relies on two main pillars to drive its business, and these should be embraced by every worker in Toyota – not only in Japan but also in all their branches around the globe (Toyota, 2005). The first pillar is “respect for people” and the second is “continuous improvement”. Respect for people is reflected in two values: respect and teamwork. Respect refers to “mak[ing] every effort to understand each other, take responsibility and do our best to build mutual trust” (Hunter, 2013, p. 16); according to Toyota (2005), this can be achieved by:

- Respect for stakeholders
- Mutual trust and mutual responsibility
- Sincere communication.

Teamwork, on the other hand, refers to “stimulat[ing] personal and professional growth, shar[ing] the opportunities of development and maximiz[ing] individual and team performance” (Hunter, 2013, p. 16). According to Toyota (2005), this can be achieved by:
Commitment to education and development

- Respect for the individual; realizing consolidated power as a team.

The second pillar, “continuous improvement”, is reflected in three values: challenge, Kaizen (continuous improvement), and Genchi Genbutsu (going to the source to make correct decisions) or close to the site (Yoshimori, 2005). In the following section, these two pillars will be explained in detail.

2.8.1 First pillar: Respect for people

Always treat your employees exactly as you want them to treat your best customers […] You can buy a person's hand, but you can't buy his heart. His heart is where his enthusiasm, his loyalty is. You can buy his back, but you can't buy his brain. That’s where his creativity is, his ingenuity, his resourcefulness. (Covey, 2004, p. 58)

Many definitions of respect for people have been posited by authors who have studied and worked in Toyota (e.g. Sugimori et al., 1977; Takeuchi et al. 2008; Ohno, 1988; Liker, 2004; New, 2007; Lander and Liker, 2007; Black, 2007; Liker and Hoseus, 2010).

Sugimori et al, (1977, p. 554) highlighted that Toyota embraces respect for people by “treat[ing] the workers as human beings and with consideration [and] Build[ing] up a system that will allow the workers to display their full capabilities by themselves”.

Takeuchi et al. (2008, p. 98) explained the importance of respect for people in terms of seeing “employees not just as pairs of hands but as knowledge workers who accumulate chie – the wisdom of experience – on the company’s front lines”.

Hunter (2013, p. 16) described the meaning of respect for people in Toyota as “refer[ring] to our own staff as well as the communities and stakeholder groups that surround us and we are part of. We respect our people and believe the success of our business is created by individual efforts and good teamwork”.

According to New (2007), respect for people in Toyota comes from making full use of workers’ capabilities and empowering and trusting them through Jaidoka. Workers in Toyota are given the authority to run and improve the processes they use,
which makes them satisfied and motivated to work to the best of their capabilities to produce as efficient a job as possible. New (2007, cited in Vogel, 1971, p. 668) stated that:

[Japanese] employees [have] little sense of individual responsibility; but by stimulating a sense of the involvement in the company’s general effort they excel in maintaining high motivation to work for the company.

According to Lander and Liker (2007), respect for people in Toyota means ensuring people’s safety, minimising unnecessary movement, and empowering them so that they can use their full capabilities to improve and participate in their daily work. Black (2007) suggested that in Toyota everyone understands his or her role; they are highly involved and motivated, which is thought to be the best way to get the most from everyone; this why the company has made respect for people a pillar in its system.

Takeuchi et al. (2008) stated that Toyota fostered the teamwork approach early on, and that this has been seen as a guiding principle when problems are found, since the workers have authority and empowerment to find a solution. According to Toyota (2005), the main pillars and principles must be followed by every employee at all levels in their daily work.

The basic HR principles within Toyota that should be followed by all companies around the world can be summarised as follows (Toyota, 2005):

1. Creating a workplace environment where employees can work with their trust in the company
   - Stable employment where layoffs and dismissals are not readily made
   - Steadily maintain and improve working conditions from a medium- to long-term perspective
   - Ensure fairness and consistency.

2. Creating a mechanism for promoting constant and voluntary initiatives in continuous improvements
   - Share the management mindset and sense of critical urgency through thorough communication
• Reflect business results in working conditions.

3. Fully committed and thorough human resources development
   • Promote personal growth through work
   • Communication of the Toyota Way/role.

4. Promoting teamwork aimed at the pursuit of individual roles and optimisation of the entire team
   • Thorough consensus building and achievement in a single thrust
   • Team results and creating a sense of unity.

In Toyota, trust between employees at different levels, as well as management, represents a fundamental principle. One of the reasons behind the mutual trust in Toyota is the “job security” policy, which means avoiding layoffs and terminations to the maximum extent possible, as the company sees its people as the driver of every change, and without whom the business will not last. Within Toyota’s stable employment policy, the prime objective is to make people feel secure, which in turn creates trust (Toyota, 2005).

Moreover, in Toyota, people are highly appreciated and regarded as assets of the company; the Toyota system is dependent upon people, and thus the company maximises their ability, skills and creativity, so that its success throughout the years can be attributed to individual efforts and good teamwork (Toyota, 2005). Takeuchi et al. (2008, p. 103) stated that in Toyota, “confronting your boss is acceptable; bringing bad news to the boss is encouraged; and ignoring the boss is often excused”, which highlights the mutual trust between subordinates and superiors, and shows that people are empowered to express their views without fear of losing their job. Toyota believes that providing job security will unleash employee creativity and ability; if people do not feel secure they will hinder their skills, and thus it is Toyota’s policy to retain employees for as long as possible. To this end, Toyota has created an employee moral survey, as well as monitoring job satisfaction (Toyota, 2005).

Strong relationships between top management and employees are highly required within LS. These relationships can be achieved by showing workers that
they are assets to the organisation so they can heavily contribute to the lean process in terms of providing ideas and suggestions, as well as solving problems, which will allow them to aid CI. Another type of relationship involves trust between management and the workforce, which is a fundamental principle in the Toyota system (Toyota, 2005). Most of the time workers do not share their opinion if they are not trusted, so they keep silent rather than giving ideas that might cost them their jobs. Job security or lifetime guaranteed employment is an essential value in the Toyota culture, and this job security encourages workers to participate and improve in work processes, which leads to better relationships with top management (Ichimura et al., 2006).

Some researchers have suggested that promising “lifetime employment” is risky, as it might make people feel complacent; Toyota realised this concern at early stages, and has always encouraged its people to work hard, bring new ideas to the table, and never feel satisfied with results. It encourages this by setting challenging targets and continuously raising the game, as it believes there is always room for improvement. According to Radeka (2009, p. 357), “human resources policies that guarantee long-term employment [in Toyota] create a stable base of accumulated knowledge to draw from”.

In Toyota, every worker from the top levels to the bottom must feel able to bring new ideas to the table, which forces people to give maximum effort; this represents the Toyota culture, in which people have to work and operate in the face of challenges (Radeka, 2009; Takeuchi et al., 2008). This is how Toyota has managed to create a distinctive culture that is able to attain CI, as it has succeeded in encouraging its employee to keep working without fearing of making mistakes, and encourages open communication, which is a core value of the Toyota culture (Takeuchi et al., 2008).

2.8.2 Second pillar: Continuous Improvement (CI)

CI is “a company-wide process of focused and continuous incremental innovation sustained over a long period of time” (Bessant et al., 1994, p. 17). Bhuiyan and Baghel (2005, p. 761) defined CI as:
A culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization. It involves everyone working together to make improvements without necessarily making huge capital investments [...] which can be] achieved through the use of a number of tools and techniques dedicated to searching for sources of problems, waste, and variation, and finding ways to minimize them.

According to Hunter (2013, p. 15), Toyota declares that:

Continuous Improvement means that we never perceive current success as our final achievement. We are never satisfied with where we are and always improve our business by putting forth our best ideas and efforts: we are keen to create better alternatives, question our accomplishments and investigate future definitions of success.

The CI in Toyota can be said to comprise three practices:

- **Challenge** – by forming a long-term vision, meeting challenges with courage and creativity to realise [Toyota’s] dreams.
- **Kaizen** – by improving the business operations continuously, always driving forward innovation and evolution.
- **Genchi Genbutsu** – by going to the source to find the facts to make correct decisions, build consensus and achieve goals.

The main enablers for CI are the supportive culture (Hyland *et al.*, 2000), which is represented in leadership, structure and shared organisational value (Jabnoun, 2001). The three aspects above can be summarised as follows.

Challenge: “Toyota often sets tough goals to raise employees’ consciousness and self-worth” (Takeuchi *et al.*, 2008, p. 100). As LS is a never-ending journey, the pursuit of perfection is an obsession in LS, which means that the organisation has to challenge its people to keep improving; this is a key issue in Toyota. According to Balle (2005), Toyota has formed a long-term vision and challenges its workers to achieve, so that they will never be satisfied even if they reach their goals. Balle (2005, p. 18) added, “I have yet to meet a lean sensei satisfied with the results of improvement activity”.

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Kaizen: this involves “focused and structured improvement project, using a dedicated cross-functional team to improve a targeted work area, with specific goals, in an accelerated timeframe” (Farris et al., 2008, p. 10). Toyota is always striving to be better, and Kaizen in Toyota means that it is improving continuously.

Toyota has huge respect for and understanding of its customers’ needs and requirements, as customers are the main reason for the existence of any organisation, and CI involves working to achieve customer satisfaction (Jabnoun, 2001).

In order to achieve customer satisfaction, Jabnoun (2001) advised understanding the three factors that underlie CI: i.e. driving value, enabling value and infusion value. Driving value consists of respect, empathy and responsibility; the enabling values are humbleness, trust, openness and cooperation; and infusion values are leadership, structure support, control system and explicit behavioural change. The driving values push people to commit themselves to achieving customer satisfaction, while the enabling values enable the organisation to achieve the aim of CI, which is to meet customer satisfaction. Infusion value relates to the top managements’ responsibility to make the organisation meet the driving and enabling values, which can be achieved through effective communication at all organisational levels; leaders should be the first people to demonstrate these values (Jabnoun, 2001).

Several suggestions have been made to help organisation to sustain CI; Jabnoun (2001) suggested that organisations should have an unambiguous rewards system to help people commit to CI, while top management must create facilities that help CI, and promote empowerment, cooperation and trust so that people can participate, and be challenged through an explicit behavioural change programme with measured targets.

Bhuiyan and Baghel (2005) believed that Kaizen or CI can be performed at three levels: group, individual and in management. Group-oriented Kaizen can be represented as a quality circle in which a group of people work to solve problems or improve processes; individual-oriented Kaizen is followed in Japanese systems in which the shop floor worker individually makes a recommendation to solve problems or improve processes; and finally management-oriented Kaizen focus on
the company’s strategy, in which every member should be involved to form and approve; it is considered a very important aspect of Kaizen.

Genchi Genbutsu: this approach is followed by Toyota to identify the source of problems and improve incrementally on the production site (Yoshimori, 2005). In Toyota, shop-floor staff deal with problems on site so that they can see problems for themselves, rather than relying on books and theories, so Toyota follows an “on-the-job training” method so its people can experience problems in real time and eventually learn to solve them (Yoshimori, 2005). Further, Balle (2005) said that the Genchi Genbutsu approach involves an “anti-meeting room” in which discussions and meetings happen with the involved people in the working area in front of the real situation.

Takeuchi et al. (2008) said that this approach is an essential aspect of Toyota’s success, as “if you have not seen something first hand, your knowledge about it is suspect”, and this approached is deeply instilled in all Toyota workers, from top management to shop-floor workers. Further, this approach allows everyone in Toyota to follow the same procedures to solve problems so that there is a standard for every problem (Radeka, 2009).

2.8.3 What Toyota’s culture looks like

Liker (2004) described the details of Toyota’s culture that make it extremely strong. He highlighted Toyota’s endeavours to make its people feel part of the company and vice versa (ownership) by mixing and socialising them with different departments from an early stage. Liker (2004) further highlighted that Toyota’s leaders believe and have trust in their people, and understand that investing in people is key to the company’s success.

Marksberry et al. (2011) explained that Toyota’s success lies in its culture, which offers long-term vision, incentives and rewards to help managers encourage people to participate in ongoing activities undertaken in the organisation.

Liker and Hoseus (2010) described the importance of trust in Toyota’s culture as distinctive. They said the trust in the company has not come through
words, but rather through policy and daily interaction among members, which eventually encouraged them to feel part of Toyota’s family.

The strength of Toyota’s culture relies on many aspects, one of which is the encouragement of managers and the fact that they lead their colleagues by example; solve problems in a collective way; and make decisions based on fact, hearing all voices and being patient. Most importantly, Toyota tends to encourage its managers to view every action in the real working area, rather than getting feedback from shop floor workers (Marksberry et al., 2011), as the managers in Toyota are educated from the early stage to perform problem solving in their own department (Womack et al., 2007).

Furthermore, managers in Toyota always have time to listen to their employees’ problems and recommendations. Takeuchi et al. (2008) explained the characteristics of Toyota’s executive which allow them to earn respect from and sustain CI. Thus, in Toyota, the managers have the following:

- Willingness to listen and learn from others
- Enthusiasm for constantly making improvements
- Comfort with working in teams
- Ability to take action quickly to solve a problem
- Interest in coaching other employees
- Modesty

Additionally, Toyota amplifies management’s focus on the CI system by challenging people to look outside the box to identify innovative approaches to improve the current system (Marksberry et al., 2011). In doing so, the management system in Toyota puts efforts into making sure that managers are creative and highly committed to attaining the goals of the company.

The core competence of Toyota is the organisational culture, which is represented in its respect for people and continuous improvement, which has not changed since its origins (Liker and Hoseus, 2010). Similarly, Emiliani (2008) says that people at all levels, including employees, suppliers, customers, investors and communities, are included in the organisational cohesive culture. Toyota’s vigour
has come from its people, and each employee in the company is called a team member. Each of them is also aware of the company’s annual and future plans in order to achieve the desired success. Random movement or behaviours are not accepted in Toyota, and each worker performs according to the company’s philosophy and principles (Liker and Hoseus, 2010).

Due to the fact that people are the key assets of the company, Toyota’s approach is to wisely select people and to be patient in developing their capacity, which takes a long time, as it believes that people can drive the wheel of improvement that will lead the company to a competitive advantage. This principle is represented in Toyota’s basic underlying values (Liker and Hoseus, 2010). Liker (2004) and Liker and Meier (2007) suggested that the key driver for competitive competency of Toyota is its way of developing team members; “[Toyota] places humans, not machines, at the centre of the company” (Takeuchi et al., 2008, p. 104).

According to Young (2000), Toyota makes small but constant improvements in its plants in order to allow its workers to understand and be aware of these improvements. This principle is crucial and significant for LS.

Another distinctive characteristic of Toyota is its “learning culture”, which is linked directly to customer management. In doing so, the company can swiftly cope with the fluctuations of customer demand (Young, 2000), and this may not be easy to imitate, particularly for companies who wish to follow Toyota’s practices. According to Liker (2004), Toyota’s success in maintaining a learning organisation environment has come from its philosophy of understanding its people and being aware of the motivational factors of human resources in any manufacturing organisation. This has enabled the company to foster a leadership and teamwork culture that has helped the company to build a robust relationship with its suppliers.

Yamamoto and Bellgran (2010) explained the fundamental mindset of LS that has been driven by experienced TPS consultants; they suggested that there must be a need to start the improvement, which should be led by people on the shop-floor, and that this can happen by allowing people to solve problems, which will result in developing their capabilities and improving the operation, as well as the organisational learning capability. Yamamoto and Bellgran (2010, p. 124) suggested that LS is driven “occasionally by force, creat[ing] a situation where people have no
choice (or little choice) but to feel the need of improvement”. Thus, instead of creating detailed plans which, most of the time, make no sense to the workers, the organisation needs to create a need or sense of urgency, and challenge its people to rise to this.

Marksberry et al. (2011) described Toyota as a distinctive example, since it is widely recognised as a learning organisation which keeps improving over time and strives to develop a challenging environment for people. This has helped the company to react and respond to market changes more effectively than other companies.

Sugimori et al. (1977) emphasised that the most distinctive feature of Toyota is the human element, in which the workers are respected and empowered as they are allowed to present and express their ideas for improving the process through active contribution.

Furthermore, Spear and Bowen (1999) confirmed that Toyota is a learning organisation as it tends to encourage people to take innovative, learn novel skills, and perform efficiently. Thus, in Toyota, every improvement tool, such as problem solving, process improvement and machine/worker connection, works according to the proper techniques/procedures. These are mandatory for people at every level in the company (Spear and Bowen, 1999).

As explained above, a number of companies in various sectors have tried to imitate Toyota, but due to a lack of understanding the core principles, such as organisational culture, these attempts have been unsuccessful (Spear and Bowen, 1999). Further, Spear and Bowen (1999) suggested that there are four key rules that must be understood for an organisation to be successful in LS. These rules are as follows:

i) How people work;
ii) How people connect;
iii) How the production line is connected; and
iv) How to improve.

Spear and Bowen (1999) found that these four rules are the secret weapons of Toyota that have driven the company to be successful throughout the years. By
following these rules, Toyota has made clear to its people how to work on a daily basis in order to avoid ambiguity and misunderstanding. According to Marksberry et al. (2011), Toyota has achieved this by instilling the teamwork spirit in each employee, and applying a strategy called Hoshin Kanri, which aligns resources and precisely explains the goals to be achieved; therefore, each worker aims and contributes to achieving the same level of outcome. Spear and Bowen (1999) further explained that nothing is hidden in Toyota, and all workers are aware of the ideal production rate required in order to perform accordingly, and improve their approach if required.

Many traits and attitudes have driven Toyota to succeed and made Toyota’s workers different from other workers around the globe. Some of these traits include a sense of fairness at work, a willingness to improve, security at work, with Toyota’s lifetime employment policy, no barriers between senior management and shop floor workers, and the chance to be promoted to managerial positions. These attitudes and traits have consolidated senior management with workers, and made them a robust unit (Sugimori et al., 1977). This has helped Toyota to execute its targets; however, some of these traits are not easy to imitate. According to Briggs (1988), a number of traits and attitudes are not exportable commodities, as they are so tightly bound to the Japanese culture and values.

Another issue that makes Toyota exceptionally distinctive is its relationship with suppliers. Toyota believes that suppliers are the cornerstone of its production system and that without a strong relationship with suppliers, LS is unlikely to happen (Vaghefi et al., 2000). Strong relationships with suppliers means involving them in processes, and an institutionalised set of practices between both parties to help transfer knowledge, and to learn quickly in engineering, designing and manufacturing (Vaghefi et al., 2000). These practices are not easy to achieve by other companies unless they also transfer their culture and values.

Further, Toyota looks at communication in the workplace with employees as the backbone for every activity, and communication is highly appreciated in Toyota, so that the company has established formal ways in which to promote communication, such as Labour-Management Councils, Joint Labour-Management
Round Table Conferences, and various subcommittees, as well as establishing a hotline that employees can use to complain if they face problems (Toyota, 2005).

According to Takeuchi et al. (2008, p. 100), Toyota considers open communication as “a core value, [and] has made its culture remarkably tolerant of failure” (Takeuchi et al., 2008, p. 100), where people can freely present their ideas and communication is easy between all departments. Furthermore, Takeuchi et al. (2008) suggested that information in Toyota flows freely from top to bottom and across functional and seniority levels, as well as between suppliers and customers.

Another issue that highlights Toyota’s respect for people is its health and safety policy, which is considered one of the main foundations that Toyota concentrates on. As respect for people is one of the two pillars that Toyota stands on, the company has striven to create a healthy and energetic workplace; every member in Toyota is responsible for safety, from senior executives to shop-floor workers (Toyota, 2005; Liker and Hoseus, 2010).

2.9 Lean within the SME context

Due to globalisation, the market has become more accessible for everyone; in order for SMEs to enjoy the benefits of globalisation, it is imperative that they adopt quality QI, as many large companies around the globe are highly reliant on SMEs as suppliers or sub-contractors, and large companies require a quality guarantee from SMEs in terms of services, materials, products, deliveries, etc. (Sohail and Hoong, 2003).

There are many ways for SMEs to contribute to the world’s economic development, as they are the key to economic prosperity, and most leading companies were SMEs before they evolved. The significant contribution of SMEs can be seen in areas such as reducing poverty by creating jobs, providing sustainability by generating sustainable sources of revenue and development processes, and motivating workers towards innovation. Acs and Audretsch (1990) declared that SMEs act in a positive way with respect to innovative activity, and that these contributions by SMEs benefit the whole economy.
2.9.1 The role of the SMEs in economies

SMEs are vital for the prosperity of economies (Ghobadian and Gallear, 1997). Culkin and Smith (2000) declared that SMEs make up the largest business sector in every world economy; the importance of SMEs has been well documented, as many governments around the world have shown interest in promoting them by supporting their growth and making them part of the country’s national development (Wang et al., 2007).

The impact of SMEs on the economy is very obvious, and a number of empirical studies have shown how large the impact of SMEs is in terms of developing economies. SMEs make major contributions to GDPs; according to Fida (2008), in high-income countries SMEs contribute over 55 per cent of the GDP and 65 per cent of total employment; in middle-income countries SMEs account for 70 per cent of the GDP and 95 per cent of employment; and in low-income countries they contribute over 60 per cent of the GDP and over 70 per cent of employment.

In most industrialised economies there is a great reliance on SMEs, as bring a great deal to the economy in terms of creating jobs, reducing poverty and the increasing societal welfare (Fida, 2008). SMEs have been praised by many researchers (e.g. Wang et al., 2007; Peacock, 2004; Hashim and Abdullah, 2000) for their role in promoting economic growth, which reflects on the GDP and leads governments around the world to acknowledge the importance of SMEs and make them part of their national economy (Abdullah, 2000).

In addition, SMEs can have a direct impact on the world’s economy as a whole, as they have the power to alleviate poverty by creating jobs; moreover, they serve as a machine for economic growth as they promote trading, employment, developing and innovating. According to Wang et al. (2007), SMEs have shown tremendous results around the world and are vital for creating economic growth and employment. As a good example of this, SMEs in the United Arab Emirates (UAE) created 86 per cent of jobs in the country, while this figure was 51 per cent in the US, 52 per cent in the UK, 75 per cent in Egypt, 77 per cent in Turkey, 80 per cent in Pakistan and 48 per cent in Morocco (Rampurwala and Marafi, 2011).
In terms of GDP, SMEs’ contribution accounted for 51 per cent in the USA and UK, 30 per cent in New Zealand and Australia, 57 per cent in Japan and Canada (Wang et al., 2007), 28 per cent in Saudi Arabia, 30 per cent in the UAE, 25 per cent in Egypt, 32 per cent in Turkey, and 30 per cent in Pakistan (Rampurwala and Marafi, 2011). From these sample statistics, how effective SMEs are in each economy (especially in developed countries) can be determined, and this is not restricted to certain countries.

Hashim and Abdullah (2000, p. 193) highlighted the importance of SMEs, and this was summarised by Ibilski (1997, p. 1), who stated that SMEs are:

Mighty minnows, reflecting the competitive spirit that a market economy needs for efficiency; they provide an outlet for entrepreneurial talents, a wider range of consumer goods and services, a check to monopoly inefficiency, a source of innovation, and a seedbed for new industries; they allow an economy to be more adaptable to structural change through continuous initiatives embodying new technologies, skills, processes or products.

Notwithstanding the contributions of SMEs, they also face a huge shortfall. According to Jocumsen (2004, p. 659), SMEs are “plagued by high failure rates and poor performance levels”, and this has been attributed to their lack of strategic planning and a general lack of acknowledgment of the importance of SMEs (Wang et al., 2007). The lack of strategic planning within SMEs comes as a result of many factors, such as a shortage of time, inadequate knowledge of the planning process, and the fact that SMEs sometimes are unwilling to share strategic plans with external consultants and employees (Robinson and Pearce, 1984).

Other researchers (e.g. Stonehouse and Pemberton, 2002) have suggested that SMEs struggle due to the small size of their business, while Shrader et al. (1989) believe that the type of business affects SMEs in terms of clear strategic planning. Wang et al. (2007) declared that strategic planning is the main factor that is lacking within SMEs, and suggested that ownership motivation is key to creating effective strategic planning within SMEs.
2.10 Inhibiting factors for SMEs that may prevent the implementation of lean system

According to Ghobadian and Gallear (1997), SMEs are slow at embracing QI, and this can be attributed to factors such as a lack of resources, a lack of skilled people, and ineffective relationships with customers and suppliers – the opposite of which is required to succeed in LS and most of QI. Achanga et al. (2006) declared that LS is not implemented in SMEs with any conviction, and SMEs are reluctant and unwilling to adopt LS unless they know the exact benefits of it.

SMEs face huge difficulties when it comes to the implementation of QI such as LS, including financial constraints and limitations in terms of other required resources (Ghobadian and Gallear, 1997) especially when it comes to suppliers and customers (Golicic and Medland, 2007).

Yusof and Aspinwall (1999) identified some of the factors that have affected Qatari SMEs with respect to the implementation of QI. Among these factors are: human and technical aspects, lack of resources, and shortage of finance.

SMEs are usually constrained by their size, and lack of technical expertise, managerial time, financial resources, and human resources, which affect their QI (Moreno-Luzon, 1993; Lee and Oakes, 1995).

Introducing LS requires cultural change (Abrahamsson and Isaksson, 2012) at different levels within the organisation, and top management needs be aware of this. Ghobadian and Gallear (1997) suggested that it is more difficult for top management in SMEs to acknowledge a need for change, and this can be attributed to factors such as their limited resources and external contacts, pressures on top management’s time, and the style of management. Without buy-in from top management, LS cannot be introduced.

Karlsson and Åhlström (1997) declared that customer input and relations are highly recommended by LS, and SMEs face difficulties in involving their customers in product design; however, the authors emphasised that “size does not exclude the usage of significant end-users for feedback” (Karlsson and Åhlström, 1997, p. 948), so integrating customers should be achievable by SMEs.
Lee and Oakes (1995) pointed out that there are some other factors that can prevent SMEs from implementing TQM, such as lack of finances (for example to provide training) and technical resources (such as expertise that would help to initiate and improve the system), and a lack of know-how.

Achanga et al. (2006) pointed out the inhibitors as a lack of leadership and funding, which prevent SMEs from creating cultural awareness towards LS and developing employee skills. According to Ghobadian and Gallear (1997), there are several factors that can affect SMEs’ culture with respect to TQM, such as:

- Education and training
- Employee participation programmes
- Enhanced communication programmes
- Revision of procedures and policies
- Modification of evaluation and reward systems
- Behaviour of top managers.

Antony et al. (2008) explained that SMEs have some weaknesses towards readiness for quality, and that these come from different sources such as planning, employee perspective, top management and human development.

In terms of planning, SMEs’ main focus is on operational matters; they do not have a long-term vision and their main concern is on the short term, while their strategy is mainly based on intuition, rather than logic or analysis, and they lack standardised and documented work. Thus, since LS is a long-term journey, it can be difficult for SMEs as they are short-term, rather than long-term, oriented (Ghobadian and Gallear, 1997).

In terms of employee perspective, it is difficult for SMEs to offer job guarantees, so workers can be made redundant easily and this will affect quality, as highly skilled workers may prefer not to work in unstable companies and this could prevent SMEs from attracting highly skilled workers. In addition, due to their lack of resources they also lack reward systems and incentives. Another difficulty relates to the fact that employees’ career goals may not be attainable within SMEs (e.g. being promoted to managerial level), which makes it difficult to hire and retain high-calibre people (Ghobadian and Gallear, 1997).
In terms of top management, managers in SMEs are often stubborn; this is not healthy for LS, which require flexibility between superiors and subordinates. Although SMEs have fewer layers of management, which should make them flexible, they can often be rigid and inflexible due to the fact that owners and top management mainly dominate the culture (Moreno-Luzon, 1993). Moreover SMEs’ owners and top management are not highly trained, and are unaware of the management aspect required to initiate QI (Ghobadian and Gallear, 1997).

Finally, in terms of human development, SMEs have difficulty in providing employees with training due to their lack of finances, vision and awareness of QI needs (Antony et al., 2008).

LS requires people who can multi-task, since in SMEs employees are often responsible for different areas (Moreno-Luzon, 1993). Although this is a good thing for LS, it can be negative if employees are not well trained. Haksever (1996) explained SMEs’ inhibitors in relation to a lack of business experience and knowledge by owners and managers, as well as a shortage of human resources and financial requirements.

Guardian and Gallear (1997) declared that SMEs always struggle to achieve QI (such as ISO 9000) due to several factors, such as the requirements of these systems, which are sometimes beyond SMEs’ abilities and require huge management commitment and buy-in. Furthermore, in order to be successful in QI, SMEs need to have skilled people and necessary technical equipment (Price and Chen, 1993), which is not always obtainable by SMEs.

Schollhammer and Kuriloff (1979) found that the barriers for SMEs lie in their lack of knowledge and technical expertise. Another obstacle is the availability of time, as quality management requires a large amount of time to implement and sustain, and SMEs might not be able to afford this (Deshpande et al., 1986; Powell and Gran, 2012). The time constraint is also likely to preclude SMEs from deploying the performance measures required by LS. Ghobadian and Gallear (1997) took a similar view, and discovered that the main resource that SMEs lack is time, which delays their progress of TQM. However, the authors believed that lack of resources does not preclude SMEs from adopting TQM and other QI.
2.10.1 Enabling factors for SMEs that may help them to adopt LS

On the other hand, several researchers (e.g. Ghoabedian and Gallear, 1997; Oviatt and McDougall 1994; Karlsson and Åhlström, 1997; Ahire et al., 1996; Haksever, 1996) have suggested that SMEs have fewer barriers to succeed in QI. According to Oviatt and McDougall (1994), SMEs have a better chance of adapting to change compared with large companies, as they can internalise and crystallise information across entire departments more efficiently. Moreover, SMEs are less hierarchical and bureaucratic than large firms, which means that they are better at responding to change (Ghoabedian and Gallear, 1997).

Antony et al. (2008) suggested that SMEs have the potential and dynamism to adopt any QI, such as LS and Six Sigma, as they have some strengths that should given them advantages. Some of these strengths include: their size, which gives them the ability to accept change; their flexibility, which means that they do not need radical change and can take what they want from LS, and have low resistance to change; and their ambitiousness to learn, which allows them to compete in the market and adapt new systems to stay alive.

Lee and Oakes (1995) showed that TQM is applicable to SMEs as they have the ability to build the required culture in terms of leadership and work force involvement much more easily than large companies, since they have relatively little functional differentiation, which makes the management very close to workers. Antony et al. (2008) shared the same view, suggesting that the organisational culture in SMEs is full of energy and that they are willing to “learn and change” rather than “control”; the SME culture is more friendly, since relationships between workers and top management are loose and informal.

Bonavia and Marin (2006) and Lee (1997) declared that LS is applicable to SMEs as they have their own strengths on which they can capitalise when they are attempting to introduce new changes. They are more flexible, able to respond quickly, have versatile human resources, and suffer less bureaucracy than larger organisations.

Top management and leadership are essential for any QI implementation; SMEs have an advantage in this regard as top management is highly visible, unlike
in large organisations where top management has to make an effort to be visible in working areas. The level of horizontal and vertical visibility is higher in SMEs than in large organisations, which in turn enhances the level of commitment and support towards other departments, which can directly and indirectly influence changes in corporate culture; this is an important factor in the successful implementation of quality management initiatives (Antony et al. 2008; Ghobadian and Gallear, 1997).

Due to their smaller size, SMEs have more chances to be closer to customers, as their employees are close to the products which will enhance employees’ responsibility and market awareness, and make them more motivated to produce what the customer wants, which is essential for QI (Antony et al., 2008; Garvin, 1991).

Another distinctive feature of SMEs is the small number of staff and management layers, which allows them to implement effective cross-functional training (Ghobadian and Gallear, 1997). Smaller numbers of employees make changes easier and faster, as changes can be transferred to other groups easily. In addition, the company’s strategy can be easily understood by all employees, so that SMEs have better chances to create an atmosphere that helps employees to develop and implement new ideas. Further, it is easier for SMEs to empower people (Phillips et al., 1983), compared to large organisations.

Employees in SMEs can also easily be made aware of the company’s profitability, which can motivate them to reach the organisation’s target and become more committed to improving the business (Garvin, 1991; Antony et al., 2008), and will make their efforts and results be seen more easily (Antony et al., 2008; Ghobadian and Gallear, 1997).

Another distinction is the organisational structure: SMEs are flat, and decision making is shorter as a result of fewer management layers, which lead to better organisation between departments as well as less resistance to change compared with larger organisations. It is also simpler for SMEs to implement TQM (Ghobadian and Gallear, 1997; Haksever, 1996), as the SMEs are less bureaucratic than large organisations, which makes coordination and communication between staff smoother (Phillips et al., 1983; Haksever, 1996). This is consistent with Åhlström’s (1998) findings, which suggested that hierarchical level is linked to
organisational culture; LS requires as little hierarchy as possible, since the responsibilities and authority in lean culture come through the lowest level of the organisation to avoid delaying processes.

In a nutshell, Ghobadian and Gallear (1997) compared ability to achieve, and chances to succeed in, QI implementation between large firms and SMEs based on six areas, namely: structure, procedures, behaviours, processes, people and contact. Table 3 shows the characteristics of both types of organisation in relation to the many factors required by LS, as well as other QI. It shows that SMEs have great chances to succeed in LS, as most of the lean requirements shown in Table 3 are within SMEs’ capabilities.
Table 3 SMEs vs. large organisations.
Source: Ghobadian and Gallear (1997)

<table>
<thead>
<tr>
<th>Structure</th>
<th>Large</th>
<th>SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchical, with several layers of management.</td>
<td>Flat, with very few layers of management.</td>
<td>Division of activities limited and unclear.</td>
</tr>
<tr>
<td>Clear and extensive functional division of activities.</td>
<td></td>
<td>Low degree of specialisation.</td>
</tr>
<tr>
<td>High degree of specialisation.</td>
<td></td>
<td>Flexible structure and information flows.</td>
</tr>
<tr>
<td>Rigid structure and information flows.</td>
<td></td>
<td>Top management close to the point of delivery.</td>
</tr>
<tr>
<td>Top management a long distance away from the point of delivery.</td>
<td>Top management’s visibility limited.</td>
<td>Top management highly visible.</td>
</tr>
<tr>
<td>Multi-sited and possibly multinational.</td>
<td></td>
<td>Single-sited.</td>
</tr>
<tr>
<td>Many interest groups.</td>
<td></td>
<td>Very few interest groups.</td>
</tr>
<tr>
<td>Normally slow response to environmental changes.</td>
<td></td>
<td>Normally rapid response to environmental changes.</td>
</tr>
<tr>
<td>Low incidence of innovativeness.</td>
<td></td>
<td>High incidence of innovativeness.</td>
</tr>
<tr>
<td>Cultural diversity.</td>
<td></td>
<td>Unified culture.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedures</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities and operations governed by formal rules and procedures.</td>
<td>Activities and operations not governed by formal rules and procedures.</td>
<td>Low degree of standardisation and formalisation.</td>
</tr>
<tr>
<td>High degree of standardisation.</td>
<td></td>
<td>People-dominated.</td>
</tr>
<tr>
<td>System-dominated.</td>
<td></td>
<td>Flexible and adaptable processes.</td>
</tr>
<tr>
<td>Rigid and unadaptable processes.</td>
<td></td>
<td>Incidence of “gut feeling” decisions more prevalent.</td>
</tr>
<tr>
<td>Incidence of fact-based decision making more prevalent.</td>
<td></td>
<td>Few decision makers.</td>
</tr>
<tr>
<td>Fragmented decision makers.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behaviour</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly bureaucratic.</td>
<td></td>
<td>Mostly organic.</td>
</tr>
<tr>
<td>Cultural inertia .</td>
<td>Fluid culture.</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Meritocratic.</td>
<td>Patronage.</td>
<td></td>
</tr>
<tr>
<td>Rigid corporate culture dominating operations and behaviours.</td>
<td>Operations and behaviour of employees influenced by owners'/managers’ ethos and outlook.</td>
<td></td>
</tr>
</tbody>
</table>

**Process**

<table>
<thead>
<tr>
<th>Extended decision-making chain.</th>
<th>Short decision-making chain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex planning and control system.</td>
<td>Simple planning and control system.</td>
</tr>
<tr>
<td>Strategic process generally deliberate and formal.</td>
<td>Strategic process incremental and heuristic.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formal evaluation, control and reporting procedures.</th>
<th>Informal evaluation, control and reporting procedures.</th>
</tr>
</thead>
</table>

**People**

<table>
<thead>
<tr>
<th>Personal authority mainly low.</th>
<th>Personal authority mainly high.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual creativity stifled.</td>
<td>Individual creativity encouraged.</td>
</tr>
<tr>
<td>Dominated by professionals and technocrats.</td>
<td>Dominated by pioneers and entrepreneurs.</td>
</tr>
<tr>
<td>Individuals normally cannot see the results of their endeavours.</td>
<td>Individuals normally can see the results of their endeavours.</td>
</tr>
<tr>
<td>Ample human capital, financial resources and know.</td>
<td>Ample human capital, financial resources and know.</td>
</tr>
<tr>
<td>Training and staff development is more likely to be planned and large-scale.</td>
<td>Training and staff development is more likely to be ad hoc and small scale.</td>
</tr>
<tr>
<td>Specified training budget.</td>
<td>No specified training budget.</td>
</tr>
<tr>
<td>High incidence of unionisation.</td>
<td>Low incidence of unionisation.</td>
</tr>
<tr>
<td>High degree of resistance to change.</td>
<td>Negligible resistance to change.</td>
</tr>
<tr>
<td>Potentially many internal change catalysts.</td>
<td>Very few internal change catalysts.</td>
</tr>
<tr>
<td>Wide span of activities.</td>
<td>Narrow span of activities.</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Extensive external contacts.</td>
<td>Limited external contacts.</td>
</tr>
<tr>
<td>Large customer base.</td>
<td>Small customer base.</td>
</tr>
</tbody>
</table>
2.10.2 Applicability of lean systems within the SME context

Lean concepts and techniques have been extensively discussed in the past, with particular attention given to large organisations (White et al., 1999; Conner, 2001; Achanga et al., 2006); however, there is a lack of empirical studies on lean CSFs focused on SMEs (Achanga et al., 2006; Bruun and Mefford, 2004; Anand and Kodali, 2008; Upadhye et al., 2010b; Golicic and Medland, 2007).

According to Rose et al. (2011), LS is considered to be the best manufacturing system in the 21st century, and entails 17 practices that are specifically applicable to SMEs, plus hundreds of lean practices that are available and being implemented by many different-sized industries (Pavnaskar et al., 2003). Table 4 demonstrates the applicability of lean practices within SMEs.

Upadhye et al. (2010a), in their study on the importance of lean manufacturing system to achieve sustainable development of organisations in India, suggested that although lean tools are well known and very popular in India, especially among large companies, SMEs in India do not fully use them.

Many authors have alleged that LS are more suitable for large industries than SMEs (e.g. Shah and Ward, 2003; Achanga et al., 2006; Wong et al., 2009; Powell and Gran, 2012); they argue that there is difficulty for SMEs to cope with LS due to their lack of required resources and capabilities. However, other researchers disagree (e.g. Ghobadian and Gallear, 1997; Karlsson and Åhlström, 1997; Ahire et al., 1996), stating that size does not affect a firm’s ability to implement LS/QI, and that SMEs can implement these systems as effectively as large organisations can.

According to Karlsson and Åhlström (1997), lean principles are within SMEs’ capabilities, and just because LS came from a large multinational company (Toyota), it is not the case that it cannot be implemented in smaller firms. Ghobadian and Gallear (1997) took the same view, stating that the essential requirement for TQM is within SMEs’ capabilities.

Due to aspects including financial constraints and limitations in terms of resources such as skilled people, especially when it comes to suppliers and customers (Golicic and Medland, 2007), SMEs could face huge difficulties in
implementing LS, though they can undoubtedly benefit from at least some of the lean tools available (Bonavia and Marin, 2006; Lee, 1997).

Furthermore, according to Oviatt and McDougall (1994), SMEs have a better chance of adapting to change compared to large companies, as they are less hierarchical and less bureaucratic than large firms, and can thus internalise and crystallise the information across entire departments more efficiently than large corporations can.

With regards to SMEs themselves, Mallur et al. (2011) found that there is no notable difference between small firms and medium-sized firms in terms of their implementation and perceptions of TQM. However, Kumar and Antony (2008) found that, due to their lack of resources, smaller firms pay less attention to quality departments and the formation of problem-solving teams (factors that are essential for LS) than medium-sized firms do.

Similarly, Temtime and Solomon (2002) found that there is a significant difference in TQM behaviour between medium-sized and small firms, as medium-sized firms are able to obtain more top management and leadership commitment; have a better quality culture and philosophy; and are more able to focus on process quality and improvement.

Gunasekaran and Lyu (1997) suggested that in order for any organisation to establish LS, the organisation must have certain factors in place, such as strong relationships with suppliers and customers, a readiness to invest and provide training, top management buy-in and commitment, purchasing only required materials and parts in order to enable JIT, revisiting the layout to ensure that the process helps the flow of materials, ensuring there is a clear process to identify value- and non-value-added activities, and finally well-educated and skilled workers.

Rose et al. (2011) pointed out that there is currently no standard model for LS implementation that SMEs can adopt, as different researchers take varying perspectives, but they do show that SMEs should go for the least costly practices, such as 5s, VC or VM, standardisation of operation, statistical process control (SPC) and quality circles (QC).
Lee (1997) suggested that SMEs should be focusing on the feasible practices that are relatively low-cost and still manageable. These practices include 5s, QC, preventive maintenance and employee involvement. A similar suggestion was made by White et al. (1999), who suggested that most US SMEs are adopting QC and getting employees to multitask.

A study undertaken by Herron and Braiden (2007) specifically suggested that the five practices that should be followed by SMEs are: employee involvement, standardisation, QC, set-up reduction, and 5’s.

Although, some researchers (e.g. Anand and Kodali, 2009; Liker, 2004) have suggested that lean practices should be implemented as a full package, Golicic and Medland (2007) believed that LS can be applied partially; by applying those practices suggested earlier, SMEs can improve their performance gradually, and eventually be ready for more advanced practices (Rose et al., 2011).

From the literature, it appears that there is no unified agreement about what tools SMEs should use. Thus, organisations must understand their needs before they attempt LS, which may save them money and effort.

However, based on Rose et al. (2011), there are several recommended tools and practices that have been used mostly by SMEs, as shown in Table 4.
Table 4 Recommended practices for SMEs.
Source: adapted from Rose et al., 2011

<table>
<thead>
<tr>
<th>Recommended Practices for SMEs from the Literature</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-tasking by employees</td>
<td>* 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</td>
</tr>
<tr>
<td>Quality circles</td>
<td>* * * * * * * *</td>
</tr>
<tr>
<td>Set-up time reduction</td>
<td>* * * * *</td>
</tr>
<tr>
<td>5s</td>
<td>* * * * *</td>
</tr>
<tr>
<td>Kanban</td>
<td>* * * *</td>
</tr>
<tr>
<td>Continuous flow</td>
<td>* * * *</td>
</tr>
<tr>
<td>Preventive maintenance</td>
<td>* * * *</td>
</tr>
<tr>
<td>Small lot size</td>
<td>* * *</td>
</tr>
<tr>
<td>Total Quality Control (TQC)</td>
<td>* *</td>
</tr>
<tr>
<td>Kaizen (CI)</td>
<td>* *</td>
</tr>
<tr>
<td>Cell layout</td>
<td>* *</td>
</tr>
<tr>
<td>Standardisation</td>
<td>* * * *</td>
</tr>
<tr>
<td>Training</td>
<td>* * *</td>
</tr>
<tr>
<td>Focused factory</td>
<td>*</td>
</tr>
<tr>
<td>Supplier management</td>
<td>*</td>
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</tbody>
</table>

69
<table>
<thead>
<tr>
<th>Visual control</th>
<th>*</th>
<th>*</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee involvement</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

According to Upadhye et al. (2010b), the above practices are suitable for SMEs, and if adopted they can offer the organisation many benefits on the shop floor, and in HR. In terms of the shop floor, these practices can help to reduce cycle and lead time, increase quality, and improve efficiency in terms of machines and people. In terms of HR, they can help to increase employees’ morale, as well as their efficiency and reliability. According to Womack et al. (1990, p. 225), “lean production is a superior way for humans to make things. It provides better products, in wider variety at lower cost”.

2.11 Requirements, CSFs and barriers associated with LS

Many organisations have implemented LS, and there are several success stories relating to different regions of the world, as well as many examples of failures. The transformation from traditional systems to LS is filled with tremendous challenges and obstacles (Nordin et al., 2010); thus, the organisation must understand the requirements of LS, as well as having an awareness of the barriers that could impede it. Most importantly, the organisation needs to have CSFs in place that will ensure the success of implementation, as several authors have emphasised that LS and QI require an understanding of the systems themselves, as well as their benefits, requirements (technical and cultural) and CSFs (Achanga et al., 2006).

According to Holweg (2007), the biggest challenge facing organisations is understanding the core of LS as a philosophy, and appreciating how the organisation can deal with national and organisational culture differences. Indeed, organisational culture is the main driver for creating strategies to achieve the goals of the organisation (Wong, 2007).

LS represents a useful philosophy that can be employed in any organisation, regardless of its activity, size or sector. However, a great deal of effort needs to be made when implementing LS in order to avoid failure. Despite the enormous benefits that can be gained from LS, the literature cites a huge number of examples of failures from problems arising during the implementation process (Papadopoulou and Ozbayrak, 2005; Balle, 2005).
According to Bhasin and Burcher (2006), the success rate in LS is only 10 per cent. Failure may arise for different reasons, such as a bad external relationship with suppliers and customers (Panizzolo, 1998; Nordin et al., 2010). Other researchers suggest that failure can arise from the cultural differences highlighted during the transition (Herron and Braiden, 2007). The most important thing to be aware of is that LS is a long journey that may never end (Saurin et al., 2011), and that it requires a huge, long-term commitment (Eisenhardt and Martin, 2010), since it can take up to five years before the company begins to reap the benefits (Ohno, 1988; Womack and Jones, 2005).

2.11.1 Essential requirements for implementing lean systems

LS requires planning, vision, skilled workers and an awareness of the cost involved (Holland and Light, 1999; Bakås et al., 2011). In addition, and most importantly, the organisation needs to have management involvement and commitment in order to succeed in its lean journey (Coronado and Antony, 2002). These factors are essential, and can make or break organisations; for instance, according to Al-Mashari et al. (2003), although QI can be very beneficial to organisations that opt to use them, their implementation requires huge amounts of money.

Nordin et al. (2012a) identified several requirements for LS, such as: top-management support, multi-skilled workers, teamwork, strong relations with customers and suppliers, transparency of information, rewarding, open communication and information sharing, a culture to support CI, decentralised responsibilities, knowledge learning and leadership. Nordin et al. (2012b) suggested there are certain requirements for LS which represent an essential source for LS success, such as: leadership and direction, a change agent system, a effective communication, worker empowerment, and clear systems and controls.

Dahlgaard and Dahlgaard-Park (2006) suggested that leadership, involvement of people, strong relationships with customers and suppliers, plus cross-functional management are essential to create lean culture, although empowerment is a precondition for creating this culture. The key to adopting lean culture is having clear top management strategies and a focus on individuals in terms of involving people,
empowering them and motivating them. These things are imperative for a company that wishes to benefit from LS (Höök and Stehn, 2008). Angelis et al. (2011) suggested that in order to build a lean culture, there is a need for employee and top management commitment, and a clear strategy.

Ohno (1988) stated that the objectives and key principles of Toyota are to eliminate waste and to enhance efficiency in production, in addition to respecting human resources. Meanwhile, respect for people requires an intelligent leader who listens to employees and transfers the organisational vision to them so that they can participate in the process. These practices make up a healthy organisational culture, in which each part of an organisation plays a major role towards the CI mission (Al-Najem et al., 2012).

Kundu and Manohar (2012) stressed that LS requires certain things, such as: visible management; the establishment of a mechanism that encourages and enables autonomy; continual evaluation; communication of lean wins at the outset; the establishment of a mechanism to enable the organisation to sustain changes; and open disclosure of LS goals.

According to Black (2007), in order to establish LS the change should start from top management, and leadership is required to drive the change. Black (2007) further detailed some of the requirements to establish LS. For instance, the organisation needs: top-level management to communicate with everyone in the organisation; employee involvement; training in problem solving and waste identification; empowerment; sharing successes; and rewarding teams.

Forza (1996) identified several essential practices that have been found in the lean organisation, as follows:

- There are teams for problem solving
- Employees’ suggestions are taken very seriously
- There is a heavy reliance on quality feedback both for workers and supervisors
- Production procedures are carefully documented
- Employees are able to perform a greater variety of tasks, including statistical process controls
Forza (1996) asserted the importance of empowerment, and said that people’s productivity is affected if they have less empowerment. Thus, they should be assigned to jobs in which they can use their full capabilities, and they must be provided with training.

Forza (1996) added that in order to achieve successful LS the organisation requires certain aspects, such as:

- Commitment to continuous improvement: employees must believe that improving quality is part of their daily job.
- The formation of teams that are responsible for problem solving.
- Employee suggestions (realisation and feedback), which are taken seriously.
- Supervisors that encourage teamwork, and take the best of each employee by encouraging them towards improving and teamwork.
- Interactions between management, technicians and workers/supervisors, which is simple and visible.
- Feedback about quality performance to supervisors regarding aspects of quality performance such as waste reduction.
- Regular feedback to workers on the current processes, defect rates, machine breakdowns, etc., and the use of visible communication tools such as charts and diagrams.
- Decentralisation of authority, so that employees are given a degree of freedom in order to make decisions without consulting supervisors.
- Worker autonomy (or empowerment) to stop any machines if they notice a defect.
- Multifunctional employees who are trained to perform different jobs and tasks so that they can cover other people in case of absence or illness.
- Workers performing statistical process control, and an awareness of how to perform statistical process control autonomously.
- Machine maintenance performed by people on the shop floor, rather than assigning other people to do the job.
- Documentation on production procedures, which are well written, clear, accessible by all employees and up to date.
Bhasin and Burcher (2006) explained several requirements that are essential for LS. They divided these into two groups, technical and cultural, and suggested that these must be met in order to achieve the prime objective of LS – which is, according to Liker (1996, p. 481) “to [reduce] the time from customer order to delivery by eliminating sources of waste in the production flow”. The organisation must also meet certain technical requirements as represented in:

- Kaizen continuous improvement: the organisation must continually pursue improvement in terms of cost, quality, design and delivery.
- Cellular manufacturing: in order to reduce waiting, transport, and process time, the organisation must group the equipment and facilities required to produce a product or family of products proximally close to one another.
- Reduction of lead time and improvement in flow: the organisation should eliminate delays in change-over times by adopting SMED.
- Single piece of flow must be fully operated by producing one complete product at a time and kanban system must be operated too.
- Process mapping and radical changes and improvements to eliminate waste.
- Strong relationships with suppliers: this can be achieved by working closely with and reducing the number of suppliers.
- 5s and visual management: these must be in place to enable the organisation to mitigate confusion, clutter and inefficiency within production or within the office environment.
- TPM: this has to be practiced efficiently in order to improve the consistency, reliability and capacity of the machines.
- Specifying value: most importantly, the organisation must specify the value that the customer is willing to pay, and focus on eliminating wastes.

Bhasin and Burcher (2006) also stated that in order to meet the above technical requirements, the organisation must also meet certain cultural requirements, such as:

- Decisions must be made at the lowest level.
- A clear vision and strategy must be shared by the organisation so that everyone knows how to achieve their goals and understands exactly what they must do after implementing LS.
• Responsibility should be assigned to workers.
• The organisation needs to establish supplier relations based on commitment and mutual trust.
• A learning environment should be created, and training provided.
• There should be a focus on the customer by involving them in projects and understanding exactly what they need.
• Leadership is highly required to drive the change.

2.11.2 Barriers and obstacles

Many issues have been recognised as barriers to LS implementation. For instance, Atkinson (2010) and Vinodh and Balaji (2011) declared that the most prominent factor in LS is culture, which can have a positive or negative impact during the lean journey; they believe that there is a misconception of LS, and ignorance about the cultural requirements of LS.

Liker (2004) saw subculture as a potential source of problems, while Womack and Jones (2005) highlighted resistance to accepting new ideas in this regard. Bhasin (2012) identified several factors that could impede LS, including: cost of investment; management time; supervisory, senior management and workforce skills; employee attitudes/resistance to change; external and internal funding; cultural issues; shareholders and owners; and finally lack of implementation knowledge.

Research carried out by Deloitte and Touche (2002) suggested that the main barriers to LS are company culture, investment and cost, staff attitudes, change issues, and a misunderstanding of the process and its benefits. Moreover, the Lean Enterprise Institute (2005, cited in Bhasin, 2012) suggested that barriers include a lack of implementation knowledge, backsliding into old ways of working, management resistance, a failure to recognise the financial value of lean practices, a lack of crisis to create a sense of urgency, and employee resistance.

Boyer and Sovilla (2003) said that the main obstacles for LS include misunderstanding and undervaluing the managerial and cultural impacts of it, and the fact that many organisations do not know the requirements for creating a lean
culture; conflicting measures and illusions regarding the progress; a failure to maintain lean principles; and using LS as a set of tools, rather than a philosophy for doing business.

Atkinson (2010) suggested that there has been a misconception of LS which may have a negative impact on LS implementation; many organisations view LS as a set of tools within a rigid system, rather than as a philosophy that is tailored to help the needs of the business. Atkinson (2010) further added that organisations view LS solely as a cost-reduction system, and misunderstand the core requirements, as well as the benefits of LS.

2.11.3 CSFs for LS

It is vital for the organisation to understand the CSFs in order to mitigate the risk of failure (Kundu and Manohar, 2012). However, the first thing that organisations need to know is the meaning of the CSFs. Boynton and Zmud (1984, p. 17) stated that CSFs are:

Those few things that must go well to ensure success for a manager or an organization […] therefore, they represent those managerial or enterprise areas that must be given special attention to bring about high performance.

Table 5 provides a sample of the findings from the literature review; these reveal common CSFs and barriers for LS and other QI (such as TQM and Six Sigma) that organisations should be aware of. TQM and Six Sigma are included in Table 5 as they share the same target as LS, which is increasing customer satisfaction and aiming for CI (Chiarini, 2011a). Further, the three approaches involve similar practices, such as teamwork, brainstorming, statistical process control, and management tools, as well as basic tools such as cause and effect diagrams, Pareto charts, flow charts, etc. (Ricondo and Viles, 2005). According to (Mefford, 2009), LS has similarities to TQM and Six Sigma, and acts as a complement for QI.

The CSFs in Table 5 are based on data from different regions (developed and developing countries) and from different sizes of organisations (small, medium and large). It has been identified that there are no notable differences between developed and developing countries, which highlights the importance of CSFs, as most of these
factors represent a platform for LS. According to Mefford (2009), LS can be implemented in developing countries in exactly the same way as in developed countries; for example, Toyota has had success in many developing countries, and Ford has had successes in implementing JIT in Mexico.

However, Mefford (2009) also stated that developing countries are likely to face more difficulties as they lack several key factors, such as skilled people and managers, as well as deficiencies in the required infrastructures. Furthermore, developing countries face a challenge in terms of political and economic instability, but both developed and developing countries have similar requirements for success in LS (Mefford, 2009). Further, the results shown in Table 5 and the literature review do not highlight any notable differences between SMEs and large industries; all agree on the importance of essential factors such as suppliers, customers, skilled workers, training, etc., which again indicates the importance of these factors for starting LS.

From the literature reviewed above, as well as the findings in Table 5, it is evident that the most important factors in LS are top management commitment and leadership; supplier relations; customer relations; people (in terms of skills, training, empowerment, and involvement); communication (including teamwork and communication between people and between departments); motivation (empowerment, reward and recognition); financial capabilities; and strategic vision.

As shown in Table 5, top management and leadership is the factor that has been most frequently emphasised by researchers, which is unsurprising as LS cannot be implemented unless there is support, initiative and commitment from those who are leading the way in the firm, believe in the system, and are trying to create the right culture for LS, and are skilled, trained and motivated towards driving the change (Wilson, 2009). Moreover, researchers have stressed the importance of the role of suppliers (as the main feeders) and customers (as any company aims to maintain happy customers) within LS.

In addition, the organisation needs to have financial capability to begin the change, as it might need to involve external expertise and provide appropriate training for employees, as well as changing the layout of the firm if the current structure does not support the new system.
These factors represent essential requirements for creating the quality culture that is required for LS (Bhasin and Burcher, 2006); if they are not properly addressed, LS implementation is likely to be less effective, or even fail. However, surprisingly, none of the researchers in Table 5 have considered national culture as a critical factor; the importance of the national factor has been emphasised by many researchers (e.g. Yoshiaki et al., 2000; Adler et al., 1986; O’Connor, 1995; Jabnoun and Al Khafaji 2005; Ngowi, 2000; Abrahamsson and Isaksson, 2012), who have alleged that national culture is an important factor for LS, and QI in general.
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<tr>
<th>Author(s)</th>
<th>Focus area</th>
<th>CSFs</th>
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<tr>
<td>1. Meredith et al. (1991)</td>
<td>Implementing JIT, culture and human resources in the US</td>
<td>● Top management commitment</td>
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<td>● Training</td>
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<td>● Strong relations with suppliers and customers</td>
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<td>2. Panizzolo (1998)</td>
<td>Lessons learned from lean implementations and the relevance of relationship management in Italy</td>
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<td>● Organisational culture</td>
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<td>● Relationships with customers and suppliers</td>
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<td>3. Achanga et al. (2006)</td>
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<td>● Skills and expertise</td>
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<td>● Customers</td>
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<td>5. Kumar et al. (2009)</td>
<td>CSFs and barriers for quality management improvement in the UK</td>
<td>● Top-management involvement and commitment</td>
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<td>● Communication with employees, and employee involvement</td>
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<td>● Training and education for employees</td>
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<td>6. Mefford (2009)</td>
<td>Lean to improve productivity, and the challenges facing CEOs</td>
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- Workforce management |
| 8.  | Bakås *et al.* (2011) | Success factors for lean implementation in European SMEs | - Strong management involvement  
- Employee participation  
- Offering adequate time for preparing the organisation  
- Creating motivation to complete initiatives  
- Internal competency  
- Establishing evaluation systems for performance |
- Cultural change  
- Linking lean Six Sigma to business strategy  
- HR rewards  
- Extending lean Six Sigma to the supply chain  
- Leadership styles |
- Reward and recognition  
- Financial capabilities  
- Organisational culture |
- A shared vision and clear  
- An empowered and trained workforce  
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<td>Basic stability</td>
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<td>13. Mittal et al. (2011)</td>
<td>CSFs for TQM in Indian SMEs (service and manufacturing)</td>
<td>Lack of top-management commitment</td>
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<td>Misconception that TQM is a set of tools rather than a way of thinking</td>
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<td>No supporting infrastructure for cultural change</td>
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<td>Inconsistent management commitment from department to department</td>
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<td>Lack of synergy between quality improvement programmes and overall business strategy</td>
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<td>Poor management leadership</td>
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<td>Organisations are more concerned about short-term business returns rather than long-term sustainability of business performance</td>
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<td>Fear of change</td>
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<td>14. Zakua et al. (2012)</td>
<td>CSFs for TQM implementation in Malaysian higher education</td>
<td>Management commitment and leadership</td>
<td>Training</td>
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<td>Teamwork</td>
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<td>15. Antony et al. (2002)</td>
<td>CSFs for TQM implementation in Hong Kong organisations</td>
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<th>16. Sohail and Hoong (2003)</th>
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<td><strong>Employee training and development</strong></td>
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<td><strong>Quality measurement and benchmarking</strong></td>
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<td><strong>Top management commitment</strong></td>
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<td><strong>Customer involvement and satisfaction</strong></td>
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<td><strong>Strategy and planning</strong></td>
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<th>17. Salaheldin (2009)</th>
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<td><strong>Leadership and top-management support</strong></td>
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<td><strong>Benchmarking</strong></td>
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<td><strong>Quality goals and policy</strong></td>
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<td><strong>Team building and problem solving</strong></td>
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<td><strong>Employee empowerment involvement and training</strong></td>
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<td><strong>Use of information technology</strong></td>
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<td><strong>Product and service design</strong></td>
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<td><strong>Enterprise performance metrics for TQM</strong></td>
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<td><strong>Customer orientation and customer relationships</strong></td>
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<td><strong>Resources value addition process</strong></td>
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<td><strong>Realistic implementation schedule</strong></td>
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<td><strong>Customer and market knowledge</strong></td>
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| 18. Hodgetts et al. (1999) | CSFs of TQM implementation in the SMEs | • Supplier relationships and quality of suppliers  
• Assessing suppliers’ performance  
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| 19. Yusof and Aspinwall (1999) | CSFs for TQM within SMEs | • Top-management involvement  
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| 20. Rahman (2001) | CSFs for TQM in Australian SMEs | • Management leadership  
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<td>• Design quality management</td>
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<th>23. Radnor et al. (2006)</th>
<th>CSFs in health care organisation in Scotland</th>
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<tr>
<td>Organisational culture and ownership</td>
<td>• Effective communication and engagement throughout the organisation</td>
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<td>Developing organisational readiness</td>
<td>• Strategic approach to improvements</td>
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<td>Management commitment and capability</td>
<td>• Teamwork and joined-up whole-systems thinking</td>
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<td>Providing adequate resources to support change</td>
<td>• Setting realistic timescales for change and making effective use of commitments and enthusiasm for change</td>
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<td>External support from consultants in the first instance</td>
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2.12 Organisational culture

As discussed above, LS arose from Toyota Production System (TPS) and gained popularity as one of the best strategic practices in manufacturing sectors. Its tools and techniques have been widely used in both the manufacturing and service sectors, regardless of size and activity. The proven success of Toyota has driven the attention of many managers in all types of businesses to emulate and implement the system in their organisation (Emiliani, 2006).

According to Jabnoun (2001), cultural value was not given huge attention until the emerging success of the Japanese system, wherein authors and researchers began to study the Japanese culture to understand the values underlying it because “people's behaviour is a reflection of their values and priorities” (Jabnoun, 2001, p. 381).

Although LS has been used all over the globe, many authors and researchers have viewed it from different angles, which proves that this system cannot be copied or emulated. Hence, serious attention needs to be paid to the variables that might affect the lean journey. One of the most prominent factors that could impact directly on the lean journey is the organisational culture; furthermore, when organisational culture is talked about, the role of leadership cannot be ignored, as lean processes require a substantial leadership role from managers who fully understand the system and strive to gain benefits from it.

Abrahamsson and Isaksson (2012) suggested that organisational culture plays a major role in implementing LS, as controls the ways of doing things within an organisation; in addition, studying the organisational culture before lean implementation could help to improve the change success rate.

Atkinson (2010, p. 35) said that:

Organisations stand little chance of implementing ‘Lean’ unless they have paid at least equal attention to creating the right culture, and the conditions and circumstances which can become the foundation for implementing change.
Boyer and Sovilla (2003) took a similar view, stating that failures in LS come from different sources, or which underestimating cultural issues is one.

It is rare to study LS articles without coming across the concepts of top-management commitment and leadership, people, and the organisational culture. However, only a few researchers – if any – have explained what sort of leadership is required for the LS implementation journey. According to Dahlgaard and Dahlgaard-Park (2006), many studies have focused on the requirements of LS in terms of training people in techniques and tools, but less attention has been paid to the human factor and building the right culture to support the lean journey.

According to the literature, the initial step for creating a lean culture should come from the senior- and mediocre-level management and the leaders of the organisation. Mokhtar and Yosof (2010) suggested that involvement and buy-in are key features of LS to create the right working environment. In order to start this process, the senior management must show full commitment to and belief in providing the required support, and adequate resources, budget and investment for employee training. Assigning appropriate tasks to the right manager and leader is also believed to be a key quality within LS (Mokhtar and Yusof, 2010).

Mullins (1999) suggested that before trying to evaluate the organisational culture, it is important to examine which factors affect the culture, as there are a number of issues which can have a direct impact on organisational culture. Mullins (1999) further outlined the possible factors affecting organisational culture, such as history, goal and objective, size, location, management and staffing, primary function and adjective, and finally the organisational environment.

According to Taleghani (2010), only 10 per cent of UK companies have successful implemented LS, as the remainder have failed to understand lean philosophy properly. The reasons behind the majority of failures are cultural and management issues; as Mejab (2003) stated, these issues can cause real obstacles in the lean implementation path, since organisational culture and management are correlated to one another. Majab (2003) further insisted that top management must show some dedication to LS. Similar to Talegani (2010), Mejabi (2003) advocated addressing these issues first and also stressed that each of these issues should be taken into account to avoid LS failures.
Organisational culture has been extensively reviewed by researchers, which reflects its importance. It has been accentuated as a vital factor in implementing a successful strategy (Al-Swidi and Mahmood, 2011) such as LS or any QI. As these kinds of techniques require a long-term strategy, only good organisational culture can cope with it and eventually sustain it.

As explained above, LS has its origins in Japanese culture and was then imported to the rest of the world; it is therefore important to recognise that lean culture needs to be understood thoroughly for successful adoption and implementation. Due to globalisation, nothing is exclusive to one country any more, as LS and other QI have shifted from Japan and Western countries to different parts of the world, such as Middle Eastern, Indian, Latin American, Eastern European and Asian regions (Lacksonen et al., 2010). Each of these regions is different and unique in terms of organisational culture and national culture; therefore, in order to accomplish successful LS, each region needs to have appropriate and feasible ways of implementing it in line with the company organisational culture and the Japanese corporate culture: “successful implementation of lean will require a unique blend of Japanese corporate culture with their societal and organisational culture” (Lacksonen et al., 2010, p. 1).

Rodner et al. (2006) explained, with reference to the CI in culture within the organisation, that workers from all departments must be willing to accept the initiatives for lean implementation. Considering this fact, people are thus the most powerful tool to help in changing the culture towards CI. Furthermore, they need to be engaged in the process from the very early stages to become more effective and motivated toward generating a culture of CI (Radnor et al., 2006).

Organisational culture is one of the hardest parts in the lean journey, and may lead to its failure. The culture in LS includes encouraging people to participate in the process; if the organisation can engage people to participate, and convince them to accept the changes, it will result in creating a lean culture with more people motivated towards the change, and will change people’s mindsets towards CI’s “organisational and cultural factors [that] shape the degree of success of Lean” (Radnor et al., 2006, p. 3). Other factors have been found that help in sustaining LS
success: skilled and trained workers, strong leadership, and communication (Radnor et al., 2006).

According to Ghobadian and Gallear (1997), several issues can influence the organisational culture and make it ready for QI, such as:

- Education and training
- Employee participation programmes
- Enhanced communication programmes
- Revision of procedures and policies
- Modification of evaluation and reward system
- Behaviour of top managers.

LS requires changes to the corporate culture, from passive and defensive to open and proactive, where people’s involvement is essential, customer satisfaction is a priority and CI is a daily job for all departments. Likewise, leadership must be present on a day-to-day basis (Dahlgaard and Dahlgaard-Park, 2006).

Moreover, it is expected that an organisation must be exposed to the CSFs of LS in order to be able to understand how to create a Toyota-style culture. As explained above, lean culture is about changing mindsets, and the organisational approach should be “outside in”, which means concentrating on customers and making them feel that they are the highest priority – which is exactly what has been done in Toyota (Takeuchi et al., 2008). It is particularly about creating CI, a flat organisation with fewer barriers between senior management and workers, empowerment of people, and proper utilisation of time and undertaking the right assignments and activities. At prima facie, it seems as though these are common practices; however, in reality, they are not found to be applicable everywhere.

Cultural adaption is key to successful lean implementation (Wong, 2007). The main condition for building and achieving an excellent lean enterprise is to create a suitable organisational culture that is built on empowerment of people, partnership with stakeholders, and CI manner where all employees participate in the day-to-day decision-making process. This helps a company to achieve customer satisfaction and to reap the desired benefits from LS. It is believed that if the culture
is built in this way, leaders will be able to gradually get rid of the traditional management style.

Schein (2004, p. 12) defined organisational culture as:
a pattern of shared basic assumptions that has been learnt whilst solving problems, that has worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.

This definition is very consistent with the lean concept, as LS involves pursuing perfection, and it is unlikely to be attained unless organisations are ready to learn from their mistakes and develop a habit of solving problems on a daily basis. Developing habits of problem solving may not be easy, however, as they require a great deal of sacrifices and continuous efforts not only from leaders and managers, but also from the entire organisation. CSFs, therefore, are key for LS implementation in order to understand what type of culture any organisation needs adopt.

Moreover, research conducted by Appelbaum et al. (1998) revealed that poor communication and lack of leadership has a direct impact on company culture. This view is supported by Swe and Kleiner (1998), who suggested that strong leadership is a key element to achieving the desired culture within a company.

Some researchers have shown that in order to be lean, the organisational culture has to be supportive of education, training, involvement and teamwork (Thompson, 2000; Peters and Waterman, 1982; Dale et al., 1997; Crosby, 1979; Dale, 1999). Further, Bounds et al. (1994) added that for a business to stay competitive in any market, CI must be a way of life for all its employees.

Lacksonen et al. (2010) suggested that the industry’s management dedication to promoting a culture of CI and investing in people are more vital for lean implementation than tools and techniques, and that changes towards LS will be more effective if they are supported by top management. The main requirements for LS deployments are respecting people, knowing their capabilities what is best for them, assigning them to the right tasks, and taking a long-term vision, which requires patience and CI by focusing on processes. Liker (2004) suggested that these
objectives are not easy to meet, and that they seem to be unfamiliar to Western culture.

Basically, the culture of creative tension and innovation, which focuses on producing with less waste, can only be achieved if the organisation has the commitment of its staff towards solving their own problems and creating new ways to do their jobs in a very comfortable and secure environment; this is why lean techniques creates new demand from an industrial relations perspective (Forrester, 1995).

Creating an appropriate culture could involve huge resistance from employees, as culture is something that cannot be changed through rewards or controls by managers (Buchanan and Huczynski, 1997; Bhasin and Burcher, 2006).

Forrester (1995) emphasised that not every culture is successful, and it is very hard to change an organisational culture to facilitate LS. Forrester (1995) suggested that the major reason behind this failure is the organisational resistance to accept the new system; Hall (2004), meanwhile, stated that the lean production system invented and practiced by Toyota may not be easily adapted and emulated by other organisations due to variations in the prevailing culture and the ways in which processes are managed.

A number of factors and attitudinal approaches have been explored and explained by a variety of researchers, which helps in promoting lean culture. The most prominent factors detailed above, which may affect the lean journey in both negative and positive ways, include: committed senior management, visionary leadership, dedicated employee involvement, clear vision and strategy, empowerment and motivation of people, teamwork, incentive and reward, job security, and communication. The majority of these enablers have been adopted by Toyota (Liker, 2004; Spear and Bowen, 1999; Hunter, 2013; Sugimori et al., 1977; Toyota, 2005; Takeuchi et al., 2008; Marksberry et al., 2011).

It is never too late for any organisation to develop its business, but they must do so as soon as possible in order to succeed and stay competitive in the market; the greater the delay, the more difficult it is to change. The direction of the change should be accruing from top management, passing through middle management
towards the lower level of the whole organisation. Once the change has been applied, the whole organisation, including all managers, must be involved in the improvement process – they should not sit back and wait for results to come instantaneously. Above all, they should have commitment to change, rather than carrying out change for change’s sake (Sohal and Egglestone, 1994).

2.13 National culture

Many cultural aspects can have a direct impact on organisational culture, and one of the most important aspects in this regard is national culture, which plays an essential role in forming corporate culture (Adler et al., 1986; O’Connor, 1995). Van Oudenhoven (2001) suggested that differences between organisational cultures arise as a result of perceived individual inconsistencies in the national culture. The national culture can have a direct impact on managers, which may hinder the transfer of production systems (Yoshiaki et al., 2000). Similarly Ali et al. (1997) and Abdalla and Al-Homoud (2001) suggested that the national culture is more effective in shaping employee attitudes and behaviours than the organisational culture, and can have an influence for both managers and employees.

According to Hofstede (1997, p. 262), the national culture is “the collective programming of the mind acquired by growing up in a particular country”, which become part of its inhabitants and it is difficult to change, since it is acquired from childhood and increases over the years. Organisational culture is “the collective porogramming of the mind that distinguishes the members of one orgainsiation from another” (Hofstede, 1997, p. 262).

Jabnoun and Al Khafaji (2005, p. 4) defined national culture as “shared assumptions that have been formed by common experience and history of events”. According Jabnoun and Al Khafaji (2005) and Ngowi (2000), national culture is one of the key elements to determine the success or failure of QI implementation. Jabnoun and Al Khafaji (2005) and Ngowi (2000) showed that national culture has an effect on the implementation of TQM, and suggested that because of national culture, TQM could fail in some countries. Many authors have also highlighted the importance of national culture in implementing QI: according to Ralston et al. (1997), national culture influences the organisational value; Michael and College
(1997) suggested that national culture is a determinant for managers’ behavior; while Baba and Falkenburg (1996) believed that it can influence organisational structure.

Many authors (e.g. Jabnoun and Al Khafaji, 2005; Al Khafaji, 2001; Collins, 1994) have asserted the important of culture in designing, producing and improving products to reach customer satisfaction. This type of culture requires empowerment and CI to meet the aim of any QI, which is customer satisfaction, as customers are the main reason for any company’s existence (Jabnoun and Al Khafaji, 2005).

Juran (1989) said that there are two type of customers: internal and external customers. To achieve the satisfaction of external customers, the organisation needs to provide quality products that the customers have asked for, and deliver these at the right time; in order to achieve this a vibrant culture and conductive structure is needed (Jabnoun, 2001). In order to achieve the satisfaction of internal customers (people within the organisation), the organisation must promote a teamwork culture and empowerment (Parker and Price, 1994). Jabnoun and Al Khafaji (2005) asserted that empowerment must be rooted in the organisational culture to achieve customer satisfaction; Parker and Price (1994) found that empowerment is positively correlated with employee pleasure.

LS implementation will have an effect on the culture, as it requires changing strategies and altering ways of work to meet LS objectives, for instance by empowering people, promoting involvement, providing training, etc.; these practices can easily be influenced by the national culture, and LS can be influenced by many other factors, such as geographical location, organisational size, type of product (sector) and organisational tradition (Abrahamsson and Isaksson, 2012).

Although national culture is an important determinant for ensuring successful implementation of QI, QI also relies on other factors such leadership, knowledge and awareness of quality management, corporate culture and structures (Jabnoun and Al Khafaji, 2005).

2.13.1 What kind of national culture does lean system require?

Hofstede (1980) developed five dimensions to measure national culture in 66 countries from 1967–1973, which resulted in 116,000 responses; his framework has
been applied to branches of IBM companies around the world and the participants were from different levels (Chiang, 2005). This model has been demonstrated by many researchers as one of the most valid and accurate, especially in relation to workplace behaviour (Chiang, 2005), and is one of the most cited models to date (Obeidat et al., 2012).

Hofstede (1980) started with four dimensions, namely Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), and Uncertainty Avoidance Index (UAI), and later on Hofstede and Bond (1988) added another dimension, Long-Term Orientation (LTO).

Hofsted categorised all Arab countries together, as he assumed that most Arab countries share same values, principles and religion, which in turn form the national culture. In order to understand how national culture can influence the organisational practices and culture, it is necessary to understand the dimensions developed by Hofsted (1980).

1. **Power Distance Index (PDI)**

PDI is “The extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally” (Hofstede, 1997, p. 28).

This dimension can provide an indication of what should be seen in an organisation that has high or low PDI. In countries where PDI is low, there is expected to be a consultative decision-making style, less hierarchy, and managers who conduct discussions with subordinates before making decisions. On the other hand, organisations with high PDI have the opposite traits, with appreciation for hierarchical orders, employees who are afraid to disagree with managers as managers are mainly autocratic, and employees who prefer not to be consulted.

Thus, in low PDI countries, the relationships between managers and employees are flatter, and employees have less dependence on managers and more freedom; in other words, they are empowered and have the authority to disagree with bosses. The top and bottom levels of the organisation see each other equally; though there may still be a hierarchy, it helps to get the work done and can be easily
changed and modified if it does not fit the job. Organisation is decentralised, in terms of salary there is no huge gap between top and bottom levels, and workers are highly qualified (Hofstede, 1997).

In high PDI countries there is a high dependency on managers, who are “always right”; the power is only a few hands due to the centralised structure, less empowerment for employees who are expected be told what to do, and workers who are normally not well educated. In terms of salaries, there are normally big differences between top and bottom levels of the organisation. As a result, there are huge distances between managers and employees (Hofstede, 1997).

Kuwait scored high in the PDI dimension (80 out of 100, where 100 means high power distance), which indicates that there is huge respect for vertical organisation and an acceptance of the top-down management style. In addition, the workers expect to be told what they should do, and the organisation is centralised. Managers are expected to have the full power, with minimum delegation to employees.

The high power PDI in Kuwait could be attributed to the natural system in the country, as it is considered to be politically centralised and ruled by families (At-Twaijri and Al-Muhaiza, 1996). High PDI levels indicate huge respect for managers’ orders and work that is mainly done because the boss has asked for it, without negotiation. This in turn is not very supportive of LS, which requires delegation, empowerment and input from employees at all levels.

2. Individualism (IDV)

“Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family”; on the other hand, collectivism means “people from birth onwards are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty” (Hofstede, 1997, p. 51).

In high-IDV societies or organisations, people tend to concentrate on themselves. In the workplace, people act according to their own interests and the assigned work should match these. The family and work should not be joined, in
order to avoid nepotism which in turns may cause conflicts of interest. Hiring and promotion should be based on skills and qualifications, and incentive and rewards on individual performance. They (people in high IDV societies or organisations) are more focused on success than on building strong relations.

Low IDV means that people are tied to groups and take care of each other. Workers are hired based on their groups (relatives and relations), and the work assigned to the employee does not have to coincide with his/her interests. Incentives and rewards are based on group performance. Relationships prevail over tasks, and the group is taken into account for hiring and promotion (Hofstede, 1997).

Kuwait scored 38 out of 100 in this regard, which indicates that Kuwait is collectivist country where employees are more loyal to the manager than the organisational objective.

The prevalence of collectivism in Kuwait can be attributed to the Islamic religion, which emphasises unity and encourages people to work together and help each other. It can also be attributed to the nature of Kuwait society, which is based on tribes and families. According to Abdalla and Al-Homoud (2001), Kuwait has been heavily influenced by its tribal society, which promotes collectivism; in addition, Kuwait is very small and rich, and threats from outside have made its inhabitants close to one another.

According to At-Twaijri and Al-Muhaiza (1996), collectivist countries tend to promote people based on the number of years they have spent in the organisation, rather than their performance; this is why Arab managers appreciate people’s loyalty over their efficiency and productivity at work (At-Twaijri and Al-Muhaiza, 1996). Once again, collectivism is good for LS, but it has to come with low power distance so that people can express their opinions freely.

3. Masculinity (MAS)

This is not related to gender, but rather to social value, or:

the extent to which the dominant values in the society are [masculine], that is, assertiveness, the acquisition of money and things, and not caring for others, the quality of life, or people. (Hofstede, 1980, p. 46)
In a masculine culture, results are the most important thing and rewards are based on quality (everyone is awarded based on his/her performance). Masculine managers are more decisive, assertive and aggressive, and more likely to ignore other opinions and rely on their own decisions. Further, they resolve conflict by fighting things out, and their main concern is on equity, competition and performance. They strive for a performance society.

Managers in low masculine (i.e. “feminine”) cultures are less decisive and more intuitive, and always look for consensus. They stress on equality, solidarity and quality of work. In addition, their methods of conflict resolution include negotiation and compromise. They strive for a welfare society.

Masculine countries are believed to be have the better chance to succeed in manufacturing industries, as their principle is more towards doing things quickly, accurately and more efficiently, while feminine countries are believed to do well in service organisations as they are better at dealing with customers, consulting, etc. (Hofstede, 1997).

Kuwait scored 53 out of 100 in this regard, which means that Kuwait is feminine; this can be attributed to the Islamic religion again, as well as the tribal society, as these factors encourage people to strive for togetherness and help and take care of each other. According to Hofstede (1997) the feminine culture involves “working to live”, whereas in masculine culture which people “live to work”.

4. **Uncertainty Avoidance Index (UAI)**

This refers to “the extent to which the members of a culture feel threatened by uncertain or unknown situations” (Hofstede, 1997, p. 113).

High UAI means that the organisation feel threatened when it comes to pursuing uncertain things (i.e. afraid of changes), which in turn leads to the prevention of innovation and new ideas. These types of culture are motivated by security, belongingness or esteem. The workplace and employees are controlled by many rules and regulations; these rules are not based on logic, but rather on psych-logic (wherein rules are normally inconsistent and nonsensical), which makes people are more robotically programmed with regards to accepting certain rules and attitudes. People have very high anxiety under high UAI.
Under low UAI, rules are only created if there is a serious need for them. People have very low levels of anxiety, and there is a more supportive culture for developing new ideas and innovation. Motivation can be seen in terms of achievement and belongingness or esteem (Hofstede, 1997).

Kuwait scored 68 out of 112 for UAI, which indicates that the country has strong or high UAI. This can be attributed to several reasons: for instance, Kuwaiti managers are not risk takers, which is why they have high UAI as they afraid of trying new things and of unknowns, and their wealth makes them cautious about losing their money. This is in line with findings by Welsh and Raven (2004), who believe that Arab managers are not risk takers.

Another factor that can be said to contribute to the high UAI score in Kuwait is the government practice of giving Kuwaitis lifetime job security, regardless of their performance; employees can only be terminated if they have committed a crime. According to Adler (1986), lifetime employment is widespread in countries with high UAI. Although lifetime employment is very helpful for LS, it has to be offered only to people who are productive and contribute to the organisation. Further, Ali (1989b, 1990) said that employees in the GCC are not innovative whatsoever; instead of creating their own strategy, they prefer to hire someone else, and most GCC employees avoid responsibility, believing that “centralization encourages respect” (Ali, 1989b, 1990). Welsh and Raven (2004) agreed with Ali (1989b, 1990) by saying that although Kuwaiti employees do like flexibility, they are not risk takers. Another factor that creates the high UAI score includes Kuwait’s status as a country that is surrounded by mighty nations such as Iraq and Iran.

In high UAI and PDI countries, there are huge distances between top management and employees, and the lines of communication run vertically. In this type of culture, people do not have a high level of involvement as the organisation is not flat; it is like a pyramid rather than a family (Adler, 1986). In this type of culture, people need to go to the top if they want to complain or get something done (At-Tawaijri and Al-Muhaiza, 1996), and this is not very supportive towards LS.

5. Long-Term Orientation (LTO)
The organizations that rely on Long-Term Orientation demonstrate a pattern of major goals and objectives, and a clear road map to attain these goals and objectives over a period of time. (Jabnoun and Al Khafaji, 2005, p. 8)

In a long-term-oriented culture, organisations are mainly concerned with future results, and are more focused on the long term than the short term. In addition, they normally invest to make long-term changes in their organisation (Waarts and Van Everdingen, 2005).

According to Obeidat et al. (2012), organisations with a long-term culture are usually patient and prefer take stable steps towards achieving their goals; on the other hand, short-term-orientated firms have a main focus on short-term planning and quick results, as well as relaying on the past. Arab countries were not included in this dimension in Hofsted’s study, but according to Obeidat et al. (2012) they can be classified as long-term-oriented.

Abrahamsson and Isaksson (2012) conducted an interesting study that compared 14 lean principles based on Liker’s (2004) definition, and using the Hofsted national culture model to identify the requirements for LS in terms of national culture. They found that high PDI and MAS cultures negatively affect LS; strong UAI and LTO have positive effects; and there is no effect on IDV, which can be said to be due to the Japanese culture, which has low PDI, high UAI and high LTO. Thus, LS works better under conditions of low PDI, low MAS (or feminine culture), high UAI, and high LTO. According to Abrahamsson and Isaksson’s (2012) results, PDI and UAI have the greatest effect on lean principles. Teamwork and development, as well as consensus decisions, are required in cultures with low PDI.

Jabnoun and Al Khafaji (2005) found that TQM works well or is implemented more effectively in national cultures with low PD, low UA, and femininity. Customer satisfaction is largely dependent on CI and empowerment, which requires a culture of low uncertainty avoidance, low power distance, and femininity. Empowerment can be more effective in cultures of low power distance, low uncertainty avoidance and femininity. In order for CI to work, low levels of uncertainty avoidance and power distance are required (Jabnoun and Al Khafaji, 2005).
Similarly, Jung et al. (2008) found that quality management is influenced by the national culture, or, more precisely, by PD. In low-PD firms, employees were found to be more committed towards change as they were empowered; while in high-PD firms employees tended to rely on guidance from superiors. In an individualist culture, organisations are less likely to prevail in implementing QI, while in TQM teamwork and standardisation are essential, so low individualism or collectivism serve as better foundations.

2.14 How can LS be assessed?

According to Wan (2006), the evaluation of levels of leanness has not been given a great deal of attention compared to that dedicated to tools and techniques, benefits, and other aspects of LS.

Many measurement frameworks have appeared in the literature to date (e.g. Furlan et al., 2011; Shah and Ward, 2003, Shah, 2007; Mady, 2009; Anad and Kodali, 2008; Nordin et al., 2010; Goodson, 2002; Panizollo, 1998; Saleeshya et al., 2013; Karim et al., 2013), each of which target different aspects and contain different elements.

Furthermore, many articles relating to lean assessment measurement tools and frameworks have been developed by leading organisations, such as the ISI Lean Value Assessment (Industrial Solutions Inc.), Assessment (Lean Enterprise Inc.), Strategos Assessment (StrategosInc), Lean Self-Assessment Throughput Solutions, Shingo Assessment, Sai Global Assessment, etc. Despite the empirical results of these frameworks, they are not always applicable to every organisation, as each individual firm has different requirements, and sometimes the different sectors affect the applicability of the frameworks. Furthermore, the frameworks are not always helpful as they consist of too-complex elements and are too immense (Jaitly et al., 2008; Wan 2006).

Several researchers (e.g. Connor, 2001; Feld, 2000; Jordan and Michel, 2001) have suggested lean assessment surveys which could help organisations through lean implementation; each of these surveys contains scores that indicate the level of leanness in the organisation. However, some of the indicators used may be not be
helpful or appropriate for every organisation; further, the responses of survey questionnaires could be subjective, and the results could be biased (Wan et al., 2007).

2.14.1 Review of lean assessment framework

This section will review the available assessment framework to see how LS practitioners, authors and researchers have assessed organisational leanness to provide an idea about the key areas that it is necessary to focus on in order to measure the LR of K-SMMIs.

According to Karim and Arif-Uz-Zaman (2013), it is very important to measure organisational performance to realise the benefits of LS, while measuring leanness must be based on an appropriate measurement method.

As mentioned in the previous section, a number of frameworks have appeared in the literature to date (e.g. Sohal and Egglesstone 1994; Boyer 1996; Karlsson and Åhlström 1996; Panizzolo 1998; Sánchez and Pérez 2001; Goodson 2002; Bohemia 2002; Soriano-Meier and Forrester 2002; Shah and Ward 2003; Lee 2004; Doolen and Hacker 2005; Shah and Ward 2007; Shahram 2008; Anad and Kodali 2009; Wong et al. 2009; Nordin et al. 2010; Saurin et al. 2011; Saleeshya et al., 2013; Karim et al. 2013).

Table 6 lists these frameworks and explains how the researchers developed them to assess organisational performance in relation to practising LS. Some are similar, however each framework takes a different approach in terms of the categories used or the ways of asking questions; this can be attributed to the fact that leanness measurements depend on how the problem is identified by the researcher (Karim and Arif-Uz-Zaman, 2013).

Some researchers have assessed organisational leanness based on VSM (e.g. Wan et al., 2007; Kuhlang et al., 2011), while others (e.g. Levinson and Rerick, 2002; Fogarty, 1992; Marvel and Standridge, 2009) have measured it based on an evaluation of the operational efficiency and productivity.
Measuring the leanness of an organisation based on lean principles had not been done (Womack and Jones, 2003) until 2013 (Saleeshya et al., 2013; Karim and Arif-Uz-Zaman, 2013). Further, Karim and Arif-Uz-Zaman (2013, p. 176) declared that “most of the methods proposed were not supported by practical implementation and therefore validation could not be guaranteed”. Saurin et al. (2011) suggested that most lean assessment models have not assessed lean practices (such as visual management) that take place on the shop floor.

In 2013, Saleeshya et al. (2013) and Karim and Arif-Uz-Zaman (2013) published a research study regarding the assessment of organisational leanness. Their study was based on the five lean principles (specify value; identify value stream; create flow; respond to customer pull and finally pursue perfection).

Behrouzi and Wong (2011) suggested that three types of approaches have been used by researchers to measure lean performance. The first approach is to measure LS based on the lean techniques and tools that have been implemented (e.g. Doolen and Hacker, 2005; Jordan and Michel, 2001); the second is to measure LS based on an evaluation of the performance output (e.g. cost, quality, delivery, flexibility, reliability and continuous improvement) (e.g. Wan, 2006; Bayou and de Korvin, 2008); the third mixes the two approaches (e.g. Gurumurthy and Kodali, 2009).

There are huge number of articles that explain lean techniques, concepts and principles for developing their frameworks, and there is no consistency between authors, researchers and practitioners. This can be attributed to difficulties in creating general, accurate, and simple frameworks (Weick, 1979). Furthermore, according to Doolen and Hacker (2005), there is no agreement among researchers about the importance of lean practices, and many researchers have developed a framework to assess the leanness of the organisation based on different key areas. For example, Womack et al. (1990) emphasised the importance of shop-floor organisation, total quality management, identifying the value added, set-up time reduction and error-proofing equipment, while other researchers (e.g. James-Moore and Gibbons 1997; Panizzolo 1998; Karlsson and Ahlstrom 1996) have emphasised the importance of cellular manufacturing, cycle time and total productive
maintenance. Finally, Allen et al. (2001) emphasised productivity, quality, cost, and safety.

Taj (2005) developed a lean assessment tool to assess the current state of the production plant within specific perspectives. This tool determines the gap between the current state and the target one, and identifies opportunities for improvement. However, it does not suggest any specific lean tools to improve the current state.

Wan et al. (2007) developed a new way of evaluating the leaness of an organisation, which proceeds by applying different templates of LS indicators. In order to do this, they developed a web-based tool; however, they admitted that this model is not wholly effective and has some weaknesses, as it requires many templates for different environments.

Karlsson and Ahlstrom (1996) developed a framework to assess changes toward lean implementation based on nine key areas: elimination of waste; CI; multifunctional teams; vertical information systems; decentralised responsibilities; integrated functions; pull; zero defects; and JIT.

Soriano-Meier and Forrester (2002) followed similar approaches to those developed by previous researchers. They developed a framework to measure the leaness of the organisation using nine groups similar to those developed by Karlsson and Ahlstrom (1996), and added four groups identified by Boyer (1996) (quality leadership on the part of management; the use of small groups or teams for problem solving; training; and worker empowerment). The aim of their model was to measure the degree of LS adoption.

Sanchez and Perez (2001) created a checklist for lean assessment in Spanish firms; their measurement tool was based on six key areas: elimination of zero-value activities; continuous improvement; multifunctional teams; JIT production and delivery; integration of suppliers; and flexible information system. These key areas include 36 indicators. According to Wan (2006), however, this model is subjective and only provides an estimate of the characteristics of the organisational leaness.

Bergmiller and McCright (2009) saw the Shingo prize model as the best way in which to measure the leaness of an organisation. This model diluted leading models, such as those by Womack and Jones (1996), Liker (2004) and the SAE
The Shingo prize is named after Shigeo Shingo, and is awarded for excellence in manufacturing. It aims to create awareness of lean manufacturing concepts for companies, and the evaluation criteria for the prize is based on quality, organisational culture, cost, customer satisfaction, leadership, empowerment, manufacturing strategies and system integration.

Thus, it can be concluded that measurement of leanness can be done in many ways, all of which depend on the objective of the study. In Table 7, the practices have been categorised into six categories, and show the key areas that the researchers in Table 6 considered to assess the leanness of organisations, as identified from the literature review. This shows the importance of these areas for starting and sustaining LS.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Assessment purpose and approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sohal and Egglestone (1994)</td>
<td>Assessed the level of lean implementation within Australian firms based on five key areas: inventory; human resources; product design; suppliers; and methods.</td>
</tr>
<tr>
<td>Boyer (1996)</td>
<td>Considered four types of investment in the manufacturing infrastructure: quality leadership on the part of management; the use of small groups or teams for problem solving; training; and worker empowerment.</td>
</tr>
<tr>
<td>Karlsson and Åhlström (1996)</td>
<td>Created an assessment tool based on nine key areas: elimination of waste; CI; multifunctional teams; vertical information systems; decentralised responsibilities; integrated functions; pull; zero defects; and JIT.</td>
</tr>
<tr>
<td>Panizzolo (1998)</td>
<td>Explored how lean has been adopted by Italian firms, based on six areas categorised as internal or external: human resources; processes and equipment; planning and control; product design (internal factors); suppliers; and customers (external factors).</td>
</tr>
<tr>
<td>Sánchez and Pérez (2001)</td>
<td>Created a check list for lean assessment in Spanish firms based on six key areas: elimination of zero-value activities; CI; multifunctional teams; JIT production and delivery; integration of suppliers; and flexible information system.</td>
</tr>
<tr>
<td>Jordan and Michel (2001)</td>
<td>Developed a survey (36 questions) to assess organisational leanness. They stated the question in five different ways considered appropriate for different participants, such as employees, customers, suppliers, investors and executives. The key areas measured include: CI; waste reduction and identification; value stream management; flow; leadership; and employee development.</td>
</tr>
<tr>
<td>Goodson (2002)</td>
<td>Created a structured measurement tool to evaluate the level of leanness based on 11 key areas: customer satisfaction; inventory management; safety, environmental, cleanliness, order; visual management; supplier focus; commitment to</td>
</tr>
<tr>
<td>Authors</td>
<td>Measured/Developed</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bohemia (2002)</td>
<td>Measured the leanness of Australian organisations based on three key areas: management techniques/systems; design methods/tools; and production technology.</td>
</tr>
<tr>
<td>Soriano-Meier and Forrester (2002)</td>
<td>Developed a measurement framework to measure the level of leanness and level of lean adoption within UK ceramic firms based on work done Boyer (1996) and Karlsson and Åhlström (1996). They concentrated on 13 key areas: quality leadership; problem solving; training; empowerment; elimination of waste; CI; multifunctional teams; vertical information systems; decentralised responsibilities; integrated functions; pull; zero defects; and JIT.</td>
</tr>
<tr>
<td>Lee (2004)</td>
<td>Created a measurement framework based on nine key areas: inventory; team approach; processes; maintenance; layout and material handling; suppliers; set-up and lot size; quality; and production control and scheduling.</td>
</tr>
<tr>
<td>Doolen and Hacker (2005)</td>
<td>Assessed the level of lean implementation in the Pacific northwest region based on six areas: shop-floor management; manufacturing equipment and process; product development; workforce management; customer relations; and supplier relations.</td>
</tr>
<tr>
<td>Shah and Ward (2007)</td>
<td>Developed a measurement tool for large manufacturing industries based on five areas: suppliers; customers; human resources; processes (pull, flow, scheduling); and planning and control (ensuring product quality).</td>
</tr>
<tr>
<td>Bayou and de Korvin</td>
<td>Compared production leanness of General Motors and Ford Motor Company, benchmarked against Honda Motor</td>
</tr>
<tr>
<td>Year</td>
<td>Author(s)</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
</tr>
<tr>
<td>2008</td>
<td>Company.</td>
</tr>
<tr>
<td>2008</td>
<td>Shahram (2008)</td>
</tr>
<tr>
<td>2009</td>
<td>Gurumurthy and Kodali (2009)</td>
</tr>
<tr>
<td>2009</td>
<td>Wong et al. (2009)</td>
</tr>
<tr>
<td>2010</td>
<td>Nordin et al. (2010)</td>
</tr>
<tr>
<td>2011</td>
<td>Saurin et al. (2011)</td>
</tr>
<tr>
<td>2012</td>
<td>Stone (2012b)</td>
</tr>
<tr>
<td>Saleeshya <em>et al.</em> (2013)</td>
<td>Assessed lean based on a conceptual model. Measured the enabling factors that help lean within the organisation based on lean principles grouped into seven categories: value; value stream; flow; pull; perfection; robust products and processes; and human aspect.</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Karim <em>et al.</em> (2013)</td>
<td>Developed a measurement framework to assess the efficiency and effectiveness for continuous evaluation of lean implementation based on lean five principles: value; value stream; flow; pull and perfection.</td>
</tr>
</tbody>
</table>

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Table 7 Key areas addressed by the different researchers in assessing organisational leanness

<table>
<thead>
<tr>
<th>Key areas</th>
<th>Appears in the reviewed literature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  2  3  4  5  6  7  8  9  10  11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td>Processes</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
<tr>
<td>Planning and control</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
<tr>
<td>Human resources</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
<tr>
<td>Customer relations</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *</td>
</tr>
</tbody>
</table>

Other models have also been developed by popular organisations and researchers that have aimed to assess LS aspects relating to organisational culture and administration actions, such as creating a learning environment to support LS. Among those models is the Shingo Prize, the Lean Enterprise Model and the SAE standards (Saurin et al., 2011).

Doolen and Hacker (2005) summarised key features of the available industrial assessment tools: Table 8 shows the key areas that these models have concentrated on. Apart from the study by Jordan and Michel (2001), these frameworks could not be reviewed due to the lack of availability of the models.
<table>
<thead>
<tr>
<th>Conducted by</th>
<th>Title</th>
<th>Assessment tools and investigated areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jordan and Michel (2001)</td>
<td>Survey of Perceptions of a Company’s Leanness</td>
<td>Developed a survey (36 questions) to assess organisational leanness; their survey can be applied to different stakeholders such as employees, customers, suppliers, investors and executives. The key areas measured are: continuous improvement, waste reduction and identification, value stream management, flow, leadership and employee development.</td>
</tr>
<tr>
<td>Lean Enterprise Implementation Group (1999)</td>
<td>The 360 Lean Audit</td>
<td>Aimed to identify the implementation level in terms of lean techniques and tools (e.g. plan-do-check-act (PDCA), wastes, flow, pull, level production, quality, workplace organisation and maintenance in terms of equipment effectiveness and reliability), as well as assessing policies and process management.</td>
</tr>
<tr>
<td>Northwest High Performance Enterprise Consortium (2002)</td>
<td>HPEC Assessment</td>
<td>Aimed to measure the outcome of lean implementation based on several issues, such as maintenance practices, product development processes, flexible manufacturing practices, quality achievements, employee involvement and inventory management.</td>
</tr>
<tr>
<td>Robert Abair Associates, Inc. (2002)</td>
<td>Lean Checklist Self-Assessment</td>
<td>This model consisted of lean principles (e.g. pull and flow) and many practices such as JIT, Kaizen, 5s, level production (<em>heijunka</em>), performance measures, poka-yoke, workforce flexibility, lean education and training, and aimed to helped organisations to measure progress in lean implementation.</td>
</tr>
<tr>
<td>Wisconsin Manufacturing Extension Partnership (2002)</td>
<td>Lean Business Assessment</td>
<td>According to Doolen and Hacker (2005), this survey allows organisation to prioritise the important activities that help LS. This self-assessment tool is based on many lean practices and principles such as pull system, flow production, Kaizen, quick changeover, automation with human touch (<em>Jaidoka</em>), and maintenance.</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>Wisconsin Manufacturing Extension Partnership (2001)</td>
<td>How Lean is Your Culture?</td>
<td>According to Doolen and Hacker (2005), this survey aimed to help managers to identify the factors that enable and/or inhibit LS.</td>
</tr>
</tbody>
</table>
Having reviewed the available frameworks for measuring LS, it appears that there are different ways of conducting such measurements. According Wan (2006), many of the available frameworks are not applicable to all industries, and many measurement frameworks and models may also be outdated as the management techniques, as well as technology, are improving every day. Further, Jaitly et al. (2008) mentioned that most of the measurement frameworks follow the same logical patterns in terms of structuring the parameters and asking questions; however, these are not free from criticism. The weaknesses include: a lack of structure in terms of questions and parameters; a failure to relate to the LS wastes in question; repetition of parameters/questions, which may lead to misunderstandings; inappropriate weights given to parameters, which do not always reflect their importance; too much emphasis on lean tools, and not enough on the role of the people involved; questions that are too complex; and tools that are too bulky.

According to Lander and Liker (2007), the best procedure is to understand the lean principles and assess the organisation based on those principles, as every organisation has different needs and requirements in order to be lean – though the organisation must stick with lean principles.

2.15 The context of Kuwait

Kuwait is a rich Middle Eastern oil country located in the north-western region of the Arabian Gulf; the area of the state of Kuwait is approximately 18,000 km\(^2\). It is a small country with a small population: the total number of people living in Kuwait is about 3,000,000, while Kuwaiti people account for 1,000,000, which is one-third of the total population. Despite its small size and number of people, however, Kuwait is one of the richest countries in the world, and its people have social stability and a high standard of living. In addition, people in Kuwait are considered to be more open to the Western world compared to other countries in the same region, and this has created diversity in the culture (PAI, 2008).

The main religion in Kuwait is Islam, while the main language is Arabic, though English is widely used as well. Kuwait and the GCC countries are considered to consists of tribal societies. In terms of regime, Kuwait is the only democratic state in the GCC region that has sovereignty and a constitution. Laws in Kuwait are
endorsed by the National Assembly, which comprises 50 members who are elected every four years by free ballot (PAI, 2008).

The marketplace in the Middle East is growing quickly, which has caught the attention of the whole world as it is seen as a lucrative market and offers great opportunities to businesses (Welsh and Raven, 2006). This region has a high level of diversity and uniqueness in terms of its culture; Westerners must understand the region’s cultural and religious issues before starting businesses in the country, as these two factors have a great impact on shaping business in the region (Welsh and Raven, 2006). According to Abbasi and Hollman (1993), many Westerners have viewed the region as oil-rich, however very few attempts have been paid towards recognising the business opportunities within it.

The Middle East region – or, more precisely, the GCC region – has been flourishing since the discovery of oil in the 1930s, which converted the region from a desert society to a more modernised and civilised one in terms of lucrative economy, as well as ethnic variation (Welsh and Raven, 2006). As a result, many expatriates have come to the region to seek job and business opportunities; according to Welsh and Raven (2004), Kuwait was one of the first countries in the region to hire people from overseas based on qualifications, rather than links. The country experienced a particular influx of expatriates and migrants after the discovery of oil; most of these have come from Arabic countries such as Syria and Egypt, as well as Asian countries such as the Philippines, Indonesia, India, Pakistan, and other nearby nations.

2.15.1 Kuwait’s historical background

According to Welsh and Raven (2004), prior to the discovery of oil the Kuwait market was based on trading, mainly with India and East Africa. The Kuwaiti people have always been involved in business, even before oil was discovered, and thus they have an entrepreneurial spirit that has allowed them to survive and has provided basic needs for their families. This has also exposed them to more new ideas and aspects of Western culture when compared to neighbouring countries (Welsh and Raven, 2004; Al-Kazemi and Ali, 2002; At-Tawaijri and Al-Muhaiza, 1996). Kuwaitis started by forming micro and small businesses, which were then expanded to larger businesses after the discovery of oil in the 1930s (Welsh and Raven, 2004).
However after the discovery of oil, and as a result of business activity being reshaped, the contribution of small businesses declined; many small businessmen expanded their businesses to become the leading companies in the Kuwait market, while others, such as craftsmen, decided to leave their micro and small businesses and work for the government (Welsh and Raven, 2006).

Culture and religion are major issues in the GCC region, and is considered to be very important in shaping the management systems, human relations, customer relations, and employee management (Welsh and Raven, 2006). The region has been in transition since the discovery of oil, which resulted in radical changes in GCC countries in terms of creating huge revenues, and industrialisation (Abbasi and Hollman, 1993).

GCC countries have built solid relationships with Western countries (e.g. the UK and USA), which they have benefited from and which have allowed them to improve their health and education systems, as well as to have greater mobility through better communication with other parts of world (Ali, 1990).

One of the distinctive features of GCC culture is the dualities, as the countries strive to have a modern life while maintaining their tradition values, which can be seen as a contradiction as some requirements of modern life require values and religion to be compromised. According to Welsh an Raven (2006, p. 30) “Contradiction is an inherent part of Islamic culture”; however, people tend to adhere to Islamic rules and values when conflicts with other issues arise (Ali, 1993).

The Arab culture highly values fatalism, which can be expressed by saying “Allah (God) willing”, which sometimes means “I will do it if the boss wills it”, and in Kuwait is used “to delay or reposition responsibility and decision making” (Welsh and Raven, 2006, p. 44).

**2.15.2 The effect of religion on the management system**

The GCC region’s Islamic culture has guided it in how to treat people and how to operate business in terms of employee reward systems, employee relations and customer services, business transactions, financial aspects, etc. (Welsh and
Despite all the rules and guidance derived from Islam, its rules and principles are not fully implemented as there are many contradictions in terms of how people interpret the rules that causes differences in the cultures amongst Arab and Islamic countries (Ali, 1990).

According to Ali and Al-Kazemi (2006), Islam has encouraged workers to be committed to their jobs, and encouraged and fostered loyalty, honesty, flexibility and trust (Ali, 1995). Ali et al. (1997) added that Islam encourages humbleness when dealing with other people. According to Ali (2005), the Islamic work ethic is based on four concepts: effort, competition, transparency, and morally responsible conduct.

Although Islamic values are influencing most aspects of Arabic culture (Obeidat et al., 2012), many authors (e.g. Rehman and Askari, 2010; Al-Shaikh, 2003) have suggested that Arabic managers’ practices do not reflect Islamic values, and that many aspects of the religion have been ignored or neglected, especially in terms of empowerment, involvement, creativity, equal opportunity, etc. Abdalla and Al-Homoud (2001) stated that the work environment in the Arab world could be improved if the leaders and managers had followed the Islamic rule that encourages consultative leadership.

2.15.3 Managerial problems in Kuwait

The management style in the Middle East is another aspect that causes confusion, as it is highly linked to people’s background and/or roots; for instance, in the tribal society people often prefer consultative methods of management (Ali and Al-Shakhsis, 1986; Ali, 1989a), while in other backgrounds authoritarian approaches are preferred, as they give leaders full power, which is seen as part of the Islamic religion (Ali 1990).

Islamic and Arabic cultures and traditions have a huge effect on the management style in Arabic organisations; for example, if the manager is the elder member of the family, his/her (most often his) decisions will be respected even if he is not highly qualified.

According to Welsh and Raven (2006, p. 31), “Tradition dictates that a sheik follows, rather than leads, tribal family opinion”, where the sheik is the main leader.
of the group. Welsh and Raven (2006, p. 31) added “[Islam] encourage[s] respect of elder family members and stress[es] a father’s authority within a family”; in addition, the authoritarianism style is predominant in the Middle East organisation. Raven and Welsh (2004) suggested that a pseudo-consultative style has been followed by most Kuwaiti organisations; despite this, however, the final decision has to be made through the top management, and a large number of consultations are conducted for the sake of the consultation (Ali, 1989a).

There are several problems associated with management in the Middle East in general, and in Kuwait precisely, that prevent creativity and foster bureaucracy. According to Obeidat et al. (2012), managers in Kuwait are not up to date with modern management systems, and lack motivation to adopt these systems as managers do not usually like to change, since they are happy and afraid of the unknown and what new systems could bring to their business.

Al-Rasheed (2001) saw the relationship between superiors and subordinates in Kuwait as main reason for poor coordination between tasks. Further, the lack of performance evaluation and clear objective in terms of organisational direction and career path, and the shortage of planning and policies for human resources symbolise the managerial problems in Kuwait.

Another problem that Kuwaiti organisations face relates to centralisation, which is very common in Arabic organisations and results in a lack of empowerment and employee involvement (Al-Rasheed, 2001). Obeidat et al. (2012) identified another serious problem that has been largely neglected in Arab organisations, which is the lack of training that meets work needs. According to Al-Rasheed (2001), training is never a priority in Arab organisations as they see it as a waste of time and money rather than a means of human development and investing in people that will eventually reflect on the whole organisation.

In Kuwait, training programs are considered as standalone systems with no links to other activities and systems; this makes such programs ineffective, since their effectiveness is not evaluated (Abdalla and Al-Homoud, 1995).

Ali et al. (1997) conducted a study to examine the management style in Kuwait. They showed that the managerial approach tends to be consultative and
participative, as this is seen as being more effective. However, Ali et al. (1989b) and Al-Kazemi and Ali (2002) found that the management style in Kuwait is pseudo-consultative, which means that the manager or the leader in the organisation has the full power to make a decision and will consult others only when it has already been made, and thus only for the sake of it and not to aid in making the decision. Abdalla and Al-Homoud (2001) supported this view by saying that workers in Kuwaiti organisations are not allowed to comment on decisions, and relationships between managers and workers are mainly either based on fear or admiration.

Abdalla and Al-Homoud (2001, p. 512) stated:

Those who are allowed to establish stronger relationships with the boss are chosen according to the boss's whims rather than for their willingness to cooperate, their competence, or relevance to the work tasks.

Further, Abdalla and Al-Homoud (2001) emphasised that though workers do not mind these attitudes, they will ruin the organisation as they have an effect on employee involvement and commitment.

Abdalla and Al-Homoud (2001) suggested that there is a contradiction in Arab managers, as they manage, hire and motivate based on their tribal culture, rather than on performance or qualifications, but at the same time want to their organisation to be successful. Abdalla and Al-Homoud (2001) further said that tribalism promotes nepotism and favouritism, which is the main reason behind failures to develop teamwork and improve the organisation. An example of this negative affect is that Kuwaitis will often be assign to an important position regardless of their performance and qualifications, as highlighted by many researchers (e.g. Al-Kazemi and Ali 2002; Blair, 2009, Kinninmont, 2012).

According to Al-Kazemi and Ali (2002), the managerial problems in Kuwait come from different sources, such as the fact that personal relationships are prioritised over work relationships; favouritism; lack of delegation and empowerment; subjectivity in promotion and evaluation (normally based on sects and tribes); too many useless rules and regulations; rigidity and non-innovation within the organisation; outdated administrative systems and policies; and influences from cliques in the organisation.
These problems have enhanced frustration among workers within Kuwaiti organisations, which leads to a lack of improvement within the organisation; Al-Kazemi and Ali (2002) stated that the source of these problems come firstly from government policies that offer Kuwaiti residents everything “on a golden plate”, such as lifetime employment and other privileges; and secondly from traditional norms and practices.

Abdalla and Al-Homoud (1995) highlighted the sources that cause and promote bureaucracy in Kuwait, suggesting that most expatriates in Kuwait have brought their own cultures, traditions, and bureaucratic and power practices, which has adversely affected Kuwaiti organisations. Another problem is the “Kuwaitisation” system, wherein Kuwaitis are assigned to managerial jobs, rather than expatriates, regardless of their experience and the unwillingness of Kuwaitis to exert effort to execute tasks. They added that there is no proper evaluation system in Kuwaiti organisations that assess training programmes to see whether they are effective so that they can be transferred to other department or improved if needed, and this is not considered a priority. These problems can be attributed to the lack of planning and clear strategies set forth by the Kuwaiti government (Abdalla and Al-Homoud 2001).

Another indication that highlights the lack of planning and strategy by the Kuwaiti government is that they started campaigns to encourage Kuwaitis to work in private sectors, but after a short period of time increased the salaries for people in government sectors, which causes reverse migration, with Kuwaiti workers moving from the private to the public sectors (Switzerland Global Enterprise, 2012).

Harry (2007) suggested that the rapid demographic changes, highs and lows of oil prices, inequalities in relation to wealth, inadequate education systems and ineffective government policies are the main sources of managerial and human problems in the GCC region.
2.15.4 Family and non-family businesses, and their affects on promoting improvement

In the GCC region there is a large number of family-owned businesses; according to Abdalla and Al-Homoud (2001), in Kuwait 85 per cent of SMEs are considered to be family owned. Family business has some advantages and disadvantages in terms of running the business in the Middle East, considering the management style, religion and traditions described in previous sections.

According to Welsh and Raven (2006), customers and employees in the Middle East are distinctive in many aspects, such as their behaviour, and in order to perform and be committed to the organisation they require a proper and unique management motivation and reward system. Welsh and Raven (2006) added that organisations in the Middle East are usually able to successfully manage their employees, which in turn will lead to happy customers, and this is simply because most companies are run by families and are small business, which gives them flexibility and an edge with respect to fulfilling their customers’ demands by working more efficiently.

Welsh and Raven (2006, p. 44) stated

Competitive advantage [in Middle Eastern organisations] is not in the huge buying power and extensive research capabilities, but in their ability to intimately know their customers and their needs. Price competition is unlikely to be their advantage, but service can be.

Ali (1990) suggested that managers in the GCC region prefer flexibility and low formality in work as they have little respect for procedures and rules. In addition, family values promote and encourage conformity and discourage creativity. As they see flexibility and low formality in work is enhancing the stability of the organisation, since commitment and stability are highly valued in Islamic culture (Ali, 1990). Abbasi and Hollman (1993) suggested that family-owned businesses also have some negatives, as family members in the Middle East mainly hold key positions within organisations and, regardless their quality and qualifications, enjoy the privilege of high pay even if they do not make a real contribution to the
organisation (Ali, 1990). This in turn affects the morale of other employees, especially those who have better qualifications.

Ellington et al. (1996) conducted a study into the adoption practices of family-owned manufacturing firms, and found that family businesses are less likely to adopt TQM due to requirements of TQM such as cost and commitment. In addition, family-owned businesses are mainly centralised, whereas TQM requires decentralised decision making. They added that quality and management practices are likely to differ between family- and non-family-owned firms.

Ward (1988) suggested that family-owned businesses are not always willing to fulfil the requirements of TQM, as the techniques require investment and long-term planning, while family businesses favour short-term planning. As described by Ellington et al. (1996), family-owned businesses take a rather “status quo attitude”, and their main focus is on the short term. Levinson (1987) suggested that family businesses are more resistant to change and, although they always adopt improvement practices, they do not do so convincingly.

Hofer and Charan (1984) suggested that problems in family businesses arise from their methods of decision making and planning as they are more centralised, which is not very supportive to QI, as well as their lack of managerial skills and training, since their management methods are mainly informal.

Ellington et al. (1996) stated that characteristics such as centralisation are an impediment for family businesses to implement TQM holistically, since TQM requires empowerment and delegation to employees. However, Ellington et al. (1996) added that family-owned firms have great advantages in terms of successful adopting TQM, as they have high level of organisational flexibility and management informality. In order to succeed, therefore, they need less centralisation and more empowerment.

Cooper et al. (2005) highlighted differences between family- and non-family-owned businesses in terms of the implementation of strategies for customer relationship management (CRM), they found that the non-family-owned companies have better practices in dealing with customers.
Several authors (e.g. Welsh and Raven, 2006; Chua et al., 1999; Davis, 1983) are in favour of family businesses, and think that they are more flexible and have a better understanding of their customers. Davis (1983) and Chua et al. (1999) stated that family businesses tend to place more focus on individuals, are more long-term oriented, and have great emphasis on creating quality and value for their business. Further, Welsh and Raven (2006) stated that family businesses are far better at understanding customers and have better relations with them; moreover, family businesses are more focused on their employees and, in return, have better employee commitment and are more focused on quality and service.

2.15.5 The Kuwaiti industrial context

Kuwait is a newly emerging industrial market, and one of the smallest but richest countries, with the highest per capita GDP in the world (Burney et al., 2010). Because of its wealth, Kuwait is highly dependent on international trade and expatriate labour for economic growth. According to a report published by the Industrial Bank of Kuwait (2001) and Eltony (2007), the country’s industrial manufacturing sectors contribute 2.8 per cent to its GDP (excluding the petrochemical and petroleum sectors), which is very low when compared to other developing countries; for instance, the manufacturing sector in India accounts for 17 per cent GDP, while for China this figure is 35 per cent, Thailand 34 per cent, Malaysia 31 per cent, and Indonesia 25 per cent (Upadhye et al., 2010b).

According to the Public Authority for Industry (PAI, 2008), the total number of manufacturing industries in Kuwait is 1031. The main non-oil manufacturing industries are food, paper (processing and printing), chemical products, building materials and fabricated metallic products (Mady, 2009). Table 9 shows the total number of Kuwaiti manufacturing industries and how these are distributed by activity in Kuwait.
Table 9 Distribution of industrial enterprises by activity.
Source: (PAI, 2008)

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. of enterprises as of 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and beverage</td>
<td>109</td>
</tr>
<tr>
<td>Textiles, clothing and leather</td>
<td>25</td>
</tr>
<tr>
<td>Wood and wood products, furniture</td>
<td>100</td>
</tr>
<tr>
<td>Paper and paper products</td>
<td>78</td>
</tr>
<tr>
<td>Chemicals, coal, rubber and plastic</td>
<td>159</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>247</td>
</tr>
<tr>
<td>Machinery, equipment and basic metals</td>
<td>295</td>
</tr>
<tr>
<td>Other manufacturing industries</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1031</strong></td>
</tr>
</tbody>
</table>

2.15.6 Kuwaiti small and medium sized enterprises (K-SMEs)

SMEs play a vital role in shaping economies around the globe (Ghobadian and Gallear, 1997), and Kuwait is no exception. There are more than 30,000 registered SMEs in Kuwait; 85 per cent of these are family businesses (Kuwait Times, 2007; Abdalla and Al-Homoud, 2001). Harry (2007) suggested that SMEs in the GCC are neglected by the government, and if the government wants to create diversity and mitigate their reliance on oil they need to enhance the role of the SMEs.

Burney et al. (2010) asserted that the level of internal competition is very low in Kuwaiti manufacturing sectors. This is because there is a very low concentration of Kuwaiti SMEs (K-SMEs) in both service and manufacturing sectors, and thus K-SMEs are considered to be in an infant stage (Rampurwala and Marafi, 2011). This is revealed by several indicators, such as limited job creation for Kuwaiti people, and the low impact of K-SMEs on the economy: K-SMEs accounted for only 7 per cent of the country’s job creation (Al-Saif, 2002). Compared to other regions this contribution is very low; for example, in the UAE, SMEs created 86 per cent of jobs, while this figure was 51 per cent in the US, 52 per cent in the UK, 75 per cent in Egypt, 77 per cent in Turkey, 80 per cent in Pakistan and 48 per cent in Morocco (Rampurwala and Marafi, 2011).
Recently, there have been huge efforts to enhance the role of SMEs in the Kuwaiti context, as the government realised that SMEs may be able to improve the economy and ease the burden of government expenditure, since SMEs can create jobs and alleviate poverty, as well as raising living standards (Ibrahim, 2010). According to Fasano and Goya (2004), jobs in the GCC region can only be created in the non-oil sectors.

2.15.7 Government support for SMEs

In 2006, members of the Kuwait parliament presented a draft bill to establish an independent authority for SMEs. They highlighted the role and the importance of SMEs around the globe; according to Ibrahim (2010), most countries have benefited from SMEs via the creation of jobs, stronger productivity base, and the fact that they provide support and act as feeders for the larger industries.

The bill consisted of four chapters and 14 articles that covered most of the problems faced by K-SMEs, and included solutions for these such as enhancing the role of government to support SMEs financially, simplifying procedures, providing incentives and legislation to support SMEs, etc. However, this bill has not been approved by the government.

Al-Tamimi (2013) declared that despite the fact that the Kuwaiti government has agreed to establish funds to support SMEs, its efforts will not help to boost the economy as it lacks a clear strategic vision, which is needed to understand the roles of such projects in the economic context. In the mean time, the government is disbursing money in order to solve structural problems, which is not enough in itself to overcome the relevant problems.

Further, in order to address these problems properly, the Kuwaiti government needs to fix a number of issues, such as improving the education system in order to produce a new Kuwaiti workforce for the projects. Currently, most of those projects assigned to SMEs are run by expatriates, who do not spend their income locally but rather transfer it back to their home, which does not help to boost the economy (Al-Tamimi, 2013). Similarly, Harry (2007) suggested that the employment of foreigner labour will not help the economy to prosper, as many
foreigners are not spending their money in the host country as they send it home. Thus, Kuwait has not benefited from SMEs in terms of job creation and boosting the economy, unlike other countries in nearby regions.

The SME sector is like other sectors in Kuwait, in that the government has set a budget for funding, but failed to make this work. According to reports published by the Industrial Bank of Kuwait (2011), most projects in Kuwait have failed due to several factors, among which are instabilities in the political environment, the lengthy approval cycle for procedures, the scarcity of land, and most importantly the lack of strategic planning from the government, as there is an overlap of work in different government departments.

2.15.8 Potential barriers that contribute to delaying the development of K-SMEs

Many inhibitors have contributed to impeding the contributions of SMEs to the Kuwaiti economy. One of these is related to government policy, which has failed to encourage Kuwaiti workers to establish or work in SMEs, since most Kuwaitis prefer to work in the public sector, where there are better wages, a lower workload and, more importantly, job security. According to Harry (2007), the main problem in the GCC region relates to human resource management, since companies struggle to manage and develop their people.

Ali and Al-Kazemi (2006) declared that several factors affect Kuwaiti productivity in work and that have instilled the concept of obtaining wealth without hard work. These include Kuwaitis’ high dependency on foreign labour for every activity, and the fact that Kuwaiti people have been treated and rewarded lavishly by the government regardless of their efficiency in work or productivity. These factors have reinforced a mentality that appreciates leisure, enjoyment and affluence, without hard work. According to Eltony (2007), the fact that government policy has not placed a demand on Kuwaiti workers to be productive has left them less interested in making an effort and acquiring skills to improve their productivity levels, as they are given full employment benefits without being creative or productive.
Ali and Al-Kazemi (2006) suggested that the majority of government attention is on keeping the concept of the welfare state alive, which means taking care of everything, including housing, electricity, secures jobs and providing education, for free or at minimal prices. Al-Tarah (2003) added that the government not only provides these services at minimal cost, but also seek to distribute wealth among Kuwaitis. According to Ali and Al-Kazemi (2006), the welfare state clearly has a different meaning in Kuwait compared to in Westerns countries.

Another reason for the slow growth of K-SME sectors is that the government policies are disjointed, as various SME institutions have implemented their own policies and programmes, which sometimes contradict those of other institutions (Rampurwala and Marafi, 2011). Ali et al. (1997) and Kinninmont (2012) suggested that most of Kuwait’s inhabitants are merchants, as they set rules based on their own interests, rather than those of the country.

Many barriers are faced by K-SMEs, such as a lack of capital, training, information in the market and expertise, as well as deficiencies in terms of support from the government and banks in terms of finances, winning government contracts, legislation, and exporting (Al-Saif, 2002). According to Kinninmont (2012, p. 12), “private contracts [in Kuwait] are awarded on the basis of nepotism and personal connections rather than efficiency or cost”. Blair (2009) shared a similar view.

Ibrahim (2010) revealed several factors that are affecting K-SMEs, and these can be summarised as follows:

- Lack of management skills, which leads to bad planning;
- Fluctuation of raw materials prices, which leads SMEs to produce relatively high-cost products that eventually affect their competitiveness;
- Lack of skilled workers that have the ability to add value to the business in terms of improving production;
- Lack of funding from financial institutions;
- Poor collaboration between SMEs and government research institutions.
The government has participated in sponsoring training programs and development seminars to improve its human capital by improving skills and productivity, however, despite this support from the Kuwait government:

These regulations and instructions have been mostly undertaken within a traditional framework and outlook, rendering some of them, on many occasions, a useless exercise and a waste of resources (Ali and Al-Kazemi, 2006, p. 88).

Ali and Al-Kazemi (2006) emphasised that another inhibitor in the Kuwait environment is the hiring and promotion system for government jobs, which is based mainly on social connections, tribal identity, sectarian allegiance and political allegiance, rather than on performance or contribution. Al-Tarah (2003) asserted that the main challenges in the Kuwaiti working environment are cultural and social, and in order to eliminate these hiring and promotion have to be based on performance, rather than links and connections or background.

Ali and Al-Kazemi (2006) stated that this behaviour can be attributed to the fact that Kuwait is a small society in which everyone knows everyone, so they can easily get jobs without having high qualifications or meeting required standards, which is why in most Kuwaiti organisations, both private and public, essential things such as development, motivation and performance evaluation are ignored.

Other indicators that highlight the lack of vision and long-term strategy in the Kuwaiti government can be seen in the government policy of reducing the number of expatriates and replacing them with citizens. This has resulted in creating bureaucracy, overstaffing, reliance on the government and apathy towards hard work (Ali and Al-Kazemi, 2006). According to Harry (2007), instead of getting rid of expatriates the government should set a clear strategy that allows them to build a capable, indigenous workforce, and this can be done through providing a proper education system.

Ali and Magalhaes (2008) carried out a study to identify the barriers faced in Kuwaiti business environments for adopting e-learning for the training and learning process within. They found that lack of management support (in terms of strategic planning, developing people and investing in training) and language barriers (as most new systems and training are in English language, which is not widely understood), as well as the lack information technology (IT), and lack of time and workload are
the main inhibitors to adopting the system. The first two (lack of management support and language barriers) are specific problems in Kuwait, while the remaining factors can be seen around the world.

Kuwait has fallen behind many neighbouring countries due to its very poor innovation and productivity capability, and if the companies want to survive they must adopt new technologies and ways of doing things, which of course requires skills, knowledge and tools, and, more importantly, commitment (Ali and Magalhaes, 2008).

As a result of these issues with government policy, another problem has emerged recently with respect to Kuwaiti manufacturing sectors: many firms are migrating to neighbouring countries, such as Saudi Arabia. This is also caused by the lack of attention and support towards the manufacturing sectors themselves (Shammas, 2012).

Additional barriers that may affect K-SMMIs’ adoption of LS include an unsupportive business environment, low foreign direct investment (FDI), and low labour quality. The Kuwaiti business environment is very weak when compared to the newly industrialised economies of South East Asia. In addition, in order to start a business in Kuwait it is necessary to go through lengthy bureaucratic procedures which can take days or months, and this applies to all sectors (World Bank, 2013). This leads to low FDI, as foreigners do not see the non-oil sectors as attractive opportunities to invest in (Eltony, 2007). According to Tannock and Ahmed (2008), FDI can create a number of advantages for businesses, and can increase the level of knowledge, as well as technology and modern management techniques, and, most importantly, enhance competitiveness in the market. Thus, the low FDI in Kuwait may also have delayed LS in K-SMMIs.

The Kuwaiti government does not see FDI as a priority, or has misunderstood what FDI can bring to Kuwait, which is not only capital but also skills, expertise and technology. These are necessary if the country is serious about creating diversification in the market and mitigating its high reliance on oil. This neglect of FDI could be due to a number of different reasons: according to Kinninmont (2012), the frequent clashes between government and parliament MPs have created an instability that has affected business in Kuwait, while countries around Kuwait have
become attractive to FDI and attracted many investors. Kuwait is at a standstill, and feels no urgency to attract FDI due to the increasing oil prices that have enabled the Kuwaiti people to have high standard of living.

In addition, the quality of labour in Kuwaiti manufacturing sectors is highly dependent on expatriates, who comprise 92 per cent of manufacturing employees (Eltony, 2007). The reason for this is that expatriates have no problem with working longer hours, unlike local workers, and will accept lower wages and physically demanding jobs, as well as tolerating poorer working conditions (McMurray, 1999).

The vast majority of expatriates in Kuwait perform either unskilled or fairly low-skilled tasks; their level of education is also very low, with 74 per cent having failed to complete secondary education and only 8 per cent having higher education (Baldwin-Edwards, 2011, Blair 2009). This, in turn, affects firms’ productivity; according to Burney et al. (2010), there has been a decline in labour productivity within Kuwaiti industries, due to the fact that the quality of labour in terms of education and skills has decreased, with the main focus moving to cheap labour from abroad (Mady, 2009). According to Lopez-Claros (2005), the productivity of labour in the GCC region is very modest, as most of the labour is unskilled due to the countries’ preference to hire low-cost labour, rather than high-skilled labour that can offer higher productivity.

Another factor that might have had a direct impact on the low contribution of labour in Kuwait, according to Harry (2007), is that labours are not given proper training to perform their jobs. In addition, Kuwaiti law gives Kuwaitis great opportunities to enjoy the wealth while controlling the labour; labour in Kuwait cannot freely move from job to job, as they require legal permission from their guarantor (Kuwaiti who brought them to work in Kuwait). If the guarantor refuses to release the worker, the worker cannot force the guarantor to do so, so they accept the situation and remain silent in order to avoid losing their job. Thus, they often prefer to stay unproductive rather than going back home; they are happy to serve number of years regardless of the type of the job, and make money before leaving the country; this has prevented expatriates from fully using their skills and qualifications (Ali and Al-Kazemi, 2006). Harry (2007) supported this view by stating that foreign labour
“will often accept low pay and low skill jobs as these jobs offer better pay and savings potential than are available at home”.

2.15.9 Kuwaiti business environment

According to Ali and Al-Kazemi (2006), Kuwait does not have a healthy business environment that motivates people to work hard and encourages productive work involvement. Abdalla and Al-Homoud (2001) suggested that the factors affecting the business environment in Kuwait include: lack of competitiveness; lack of innovation, as the majority of technology is imported; unnecessary government protection; and a lack of separation between ownership and management control.

Tony Blair, the ex-prime minister of the UK, has been hired by the Kuwaiti government to analyse and set a plan and vision for Kuwait to achieve by 2030. He and his team have made a large number of recommendations to be implemented by the Kuwaiti government to help them achieve their vision for Kuwait by 2030.

According to ALSHALL (2009), Blair has written an accurate description of Kuwait, and provided guidance to take the country out of its problematic situation to superiority. Blair (2009) has noted several issues that are impeding the development of Kuwait in different sectors, among which are lack of transparency in doing business, as well as lengthy procedures and bureaucracy, and heavy reliance on the government, which are affecting creativity and productivity and need to be considered by the Kuwaiti government.

During his time in Kuwait, Blair identified certain other issues, among which are lack of land to start businesses (or establish industries), since all land is under government control. He also noted that there is great deal of intervention by the government, which creates corruption and low transparency. If the government is serious about creating diversity and reducing its reliance on oil, it needs to create a healthy business environment that will attract FDI. Harry (2007) held a similar view, stating that governments in the GCC frequently interfere with businesses, which has led to corruption and inefficiencies; moreover, Harry (2007) added that because of the power of oil, the GCC countries have come to be controlled by a small number of
people, and this has promoted nepotism as people can get what they want by having links with the people who run the country.

More importantly, there is a need to reduce the number of Kuwaiti workers in public organisations and encourage them to move to private sectors, and this can only be achieved if there is education reform. According to Harry (2007), the education system in the GCC is mainly used for developing national identity, rather than developing the work force. Another point addressed by Blair is that there is a reliance on cheap labour and low skills, and he has advised that companies hire highly skilled people so that they can transfer their knowledge to Kuwait, which can be seen as part of human development (Blair, 2009).

Kuwait relies greatly on oil; according to Blair, sooner or later the oil will disappear and the country will not survive if it does not create diversity: “[the] government expenditures could turn current fiscal surpluses into deficits within 5 to 8 years” (Blair, 2009, p. 7).

Another issue raised by Blair is that the government is investing heavily in areas such as human capital by providing training, but there is a “mismatch between the quality of the training provided and the requirements of the market” (Blair, 2009, p. 203), which equates to a lack of vision.

Further, Blair (2009) noted that there is the lack of measurement in relation to work; there are no performance measures in place to evaluate individual performance, and there is a high incidence of nepotism and favouritism in hiring and promoting, which reinforces a culture full of corruption and lacking in transparency which leads to low morale and cynicism (Blair, 2009). This has also been emphasised in other reports (Kinninmont, 2012; Switzerland Global Enterprise, 2012).

Blair’s study also highlighted a lack of vision, and the government practice of “splashing” money without identifying true needs relates to “the education and health systems [in Kuwait, which] have higher levels of expenditure than the EU average but much lower outcomes” (Blair, 2009, p. 4). This has also been identified by Harry (2007), who stated that GCC countries invest heavily in the education
system, but have failed to create the advanced technical, professional and managerial skills needed by modern economies.

Aldowaisan (2012) identified several statistics that reflect the weak business environment in Kuwait; ironically, these came three years after Blair’s (2009) recommendations for Kuwait in terms of creating diversity in the market and decreasing the dependence on oil. Kuwait scored 4.8 out of 10 on the corruption perception index (CPI), 2.8 out of 7.0 for favouritism in decisions of government officials, and 4.6 out of 7.0 for business cost of corruption.

Compared to other GCC countries (Saudi Arabia, United Arab Emirates, Qatar, Oman, Bahrain), Kuwait scored embarrassing results: it came fifth in terms of general competitiveness (GCI), human development (HDI), electronic government (EGOV), and corruption perception (CPI); and sixth in terms of knowledge economy index (KEI), business environment (EODB), ease of trading (ETI), technology employment (NRI), and travel and tourism sector (TTGI).

Surprisingly, Kuwait has moved backwards following the recommendations from Tony Blair; however this is no surprise for those who have a thorough understanding of Kuwaiti policies and predicted that Blair’s report would be kept on shelves, as other studies have been in the past. In 2012 Mr Jassem Al-Saadoun (Chairman of AISHALL Economic Consultants) highlighted in Alam Alyawm newspaper that despite the warnings from Tony Blair to the Kuwaiti government that government expenditures could turn current fiscal surpluses into deficits within five to eight years, the government had not implemented any of the suggestions, which shows that it lacks planning ability and understanding of its needs (Al-Saadoun, 2012).

Mr. Blair's vision and his team will be added to the stock of good studies on the government's shelves and which she cannot market because she is unaware of their significance (ALSHALL, 2009, p. 2).

Moreover, recent statistics published by the World Bank (2013 (Table 10) show that the business environment in Kuwait remains far from good, which has resulted in low FDI and industrial migration from Kuwait. The statistics focus on key aspects of business in any country; among these are ease of doing business,
starting business, dealing with construction permits, getting electricity and registering property, which are essential for starting businesses and attracting FDI.

According to the figures, Kuwait does not have a healthy business environment, especially compared to nearby countries in the GCC region. It is particularly lacking in relation to creating diversity in the market. The figures in Table 10 also indicate a lack of government strategy, which may reflect negatively on the manufacturing sectors, and this is this research aims to address.
Table 10 Kuwait business environment compared with other GCC countries.
Source: (World Bank, 2013)

<table>
<thead>
<tr>
<th>Country</th>
<th>Ease of doing business</th>
<th>Starting a business</th>
<th>Dealing with construction permits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>Rank</td>
<td>No. of procedures</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>22</td>
<td>78</td>
<td>9</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>26</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Qatar</td>
<td>40</td>
<td>109</td>
<td>8</td>
</tr>
<tr>
<td>Bahrain</td>
<td>42</td>
<td>88</td>
<td>7</td>
</tr>
<tr>
<td>Oman</td>
<td>47</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>Kuwait</td>
<td>82</td>
<td>142</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Getting electricity</th>
<th>Registering property</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>No. of procedures</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Qatar</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>Bahrain</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>Oman</td>
<td>54</td>
<td>6</td>
</tr>
<tr>
<td>Kuwait</td>
<td>55</td>
<td>7</td>
</tr>
</tbody>
</table>
2.15.10 Quality initiatives in Kuwait

K-SMMIs have the potential to play an important role in Kuwait’s economy; therefore, improvements in K-SMMIs could have an enormous impact in this regard, which would eventually contribute towards minimising Kuwait’s dependence on oil. According to Eltony (2007), Kuwait is expecting to rely on oil as its main product for another two decades, which is very risky, as pointed out by researchers such as Blair (2009), who said that failures to create new resources would result in deficits as early as 2017. In the meantime, oil is the backbone of the Kuwaiti economy, as it accounts for about 92 per cent of total Kuwaiti export (Switzerland Global Enterprise, 2012).

The Kuwaiti government has tried and failed to encourage the non-oil sectors, as most Kuwaiti policy has been built on reactions to situations, rather than on proper study (Eltony, 2007). Harry (2007) declared that the governments in the GCC region prefer to take an expediency approach, rather than providing solutions, and this has become a serious problem for them. Developing SMMIs is key to creating diversity, but if the K-SMMIs want to compete globally they must implement QI, as this will increase K-SMMIs’ chances to gain competitive advantage (Ghobadian and Gallear, 1997).

With regard to QI, Isaa (2007) claimed that many manufacturing companies in Kuwait (mostly large enterprises) have implemented one or more QI, such as TQM, Six Sigma, or business process reengineering (BPR). From the figures published by ISO (2008a), it can be seen that there are only 254 ISO 9000-accredited companies across the service and manufacturing sectors in Kuwait, whereas Egypt has 1944 ISO 9000-accredited companies, Saudi Arabia has 876, the UAE has 3283, Tunisia has 848, Oman and Morocco have 405, Pakistan has 2268, and India has 37,958 – this shows the slow pace at which companies are moving towards QI in Kuwait.

The adoption of QI initiatives such as LS might be a solution for improving productivity and quality within the manufacturing industries in Kuwait, as well as the other GCC countries that have begun to emerge. According to Ghobadian and Gallear (1997), QI can improve the competitive advantage of SMEs.
Given the modest role of K-SMMIs in the national economy, implementing QI in these industries is vital (Zairi, 1996). Mady (2009) emphasised that, for Kuwait, adaptation of manufacturing systems and the various related tools is inevitable. However, applying LS might not be an easy task, especially for SMMIs, since they can face more barriers than large organisations, as outlined above.

Few researchers have studied QI in Kuwait; however, although they have not focused on SMMIs specifically, their studies do provide insight. According to Garza-Reyes et al. (2011), Kuwaiti industries, as well as those in other GCC countries, are still in the early stages of understanding ISO/TQM. Zairi (1996) reported that implementation of QI in the Arabic region has occurred more slowly than in Western and Asian countries. Al-khalifa and Aspinwall (2000) concurred that the maturity level towards QI is very low in Arabic countries, and stated that this can be particularly attributed to cultural factors and language barriers, especially when translating those systems to Arabic (Tannock and Ahmed, 2008).

The barriers for TQM when implemented in the Kuwaiti oil sector have been identified by Garza-Reyes et al. (2011) as relating to a lack of understanding of such systems, as well as deficiencies in terms of quality strategies, strong management commitment, and acceptance and willingness to change.

Another study conducted by Youssef and Zairi (1995) on five GCC countries, including Kuwait, revealed that the main problems pertain to senior managers, such as low level of education; lack of commitment, available leadership, and clear missions and goals; resistance to change; lack of recognition and reward programmes; and insufficient know-how in terms of identifying problems. Further, Jaeger et al. (2013) explained that TQM does not play an important role in GCC organisations, since they do not consider the key issues for TQM, such as leadership, strategic planning, customer and market focus, and measurement and analysis, to be important. The lack of strategic planning in GCC organisations has also been addressed by Loosemore and Al Muslmani (1999) and Youssef and Zairi (1995).

According to Garza-Reyes et al. (2011), manufacturing industries in Kuwait do not emphasise customer and supplier relations, benchmarking, CI, empowerment and top management responsibility. These aspects are seen as key for successfully implementing LS systems (Liker, 2004; Shah and Ward, 2007; Nordin et al., 2012a).
Garza-Reyes et al. (2011) further showed that Kuwaiti industries do not consider the use of technology, tracking cost of quality, quality teams and employee enthusiasm and commitment as critical factors for TQM.

Mady (2009) suggested that some adaptations are needed by Kuwaiti industries in order for them to be successful in TQM implementation. These include: more focus on customer and human resources, continued process improvement, and the adoption of accurate quality measures. The study further indicated that K-SMMIs have implemented some quality management practices such as customer focus (understanding customers’ needs, taking customer feedback seriously, and customer service), HR (practising teamwork, and shared vision with employees), and process quality (focus on CI, the use of SPC, and process improvement), but large Kuwaiti industries use quality and management practices to a much greater extent than SMMIs do. Mady’s (2009) findings are consistent with those of other researchers, such as Yong and Wilkinson (2001) and Zhao et al. (2004).

Al-Nofal et al. (2004) suggested a number of CSFs for TQM in Kuwait, such as: top management commitment, CI, decision making at lower levels, employee commitment, quality teams, and closer relationships with suppliers and customers.

Developing countries like Kuwait offer great opportunities for foreign investment (Abbas, 1996); indeed, Kuwait has the potential to become a new source of goods and services exported to Europe and other parts of the world due to the availability of low-cost labour in the country, as well as its prime geographical location (Youssef and Zairi, 1995). However, in the meantime the image of GCC countries resembles as rich countries wasting their wealths (Harry, 2007).

In addition, Kuwaiti industries that wish to expand to be more competitive only need to implement innovation and quality approaches, and have know-how in terms of managing their resources. As suggested by Welsh and Raven (2006), organisations in the GCC region are in a transition period as they are mainly led by young managers who have obtained their qualifications from Western universities, seem to use a participative style, and focus more on teamwork and involvement (decentralised organisation). However participative management is rare within the Gulf region.
According to Youssef and Zairi (1995), it is encouraging that there has been increased attention in Middle Eastern countries towards the adoption of QI such as ISO 9000 and TQM; this represents a radical change taking place in oil-producing countries (Al-Khalifa and Aspinwall, 2000). However, Tannock and Ahmed (2008) stated that Arab organisations have yet to feel the pressure to implement QI, and this can be attributed to the lack of awareness of QI by senior staff, a lack of customer awareness towards quality, and limited competition in the market.

2.15.11 Can ISO 9000 help K-SMMIs to implement LS?

A report published by ISO (2008a) showed that there are currently 254 ISO 9000 certified companies in Kuwait, including manufacturing and service industries. According to Ho (1994), ISO 9000 can serve as a foundation for the CI journey, as it helps to improve internal processes and monitor maintenance levels. According to Vincent and Reza (2004), there is a commonality between ISO 9000 and quality management techniques, and ISO 9000 can drive organisations towards implementing quality management practices (Lee, 1999; Sun, 2000).

Magd (2006) stated that ISO 9000 forms the basis of successful QI, as it improves the efficiency of quality systems used within firms, as well as the organisations’ quality awareness and documentation procedures. Furthermore, Kunnanatt (2007) suggested that firms have been shown to have a better quality culture after implementing ISO 9000, while Gotzamani and Tsotras (2001) pointed out that ISO 9000 can be an effective first step towards TQM, as it enables significant improvements regarding most of the TQM elements; indeed, their study showed that ISO 9000 improved the quality culture and quality commitment in Greek firms. Similarly, Mallur et al. (2011) and Ilkay and Aslan (2012) found that ISO 9000-certified firms have better usage of TQM practices and perform better than non-ISO firms, and that ISO 9000 firms are expected to have better quality and management practices than non-ISO firms.

Chiarini (2011b) found that LS is related to ISO 9000 in terms of affecting quality manuals, work instructions and procedures. Moreover, the main process of ISO 9000 follows the lean PDCA methodology (ISO, 2008b). Chiarini (2011b) added that many manufacturing companies have implemented LS after reaching ISO
9000 certification. McTeer and Dale (1996) found that ISO 9000 allowed SMEs to better define employee roles, and that employees were better trained and more committed to their jobs following ISO 9000 certification.

According to Kumar and Antony (2008, p. 1158), “ISO may be the foundation or building block before embracing lean”. They also found that ISO 9000 firms perceived the importance of CSFs in the same way as lean organisations (i.e. ISO 9000 firms acknowledged the importance of top management, training and education, linking QI with employees, communication, customer and supplier relations, and vision and planning). However, organisations can only benefit from ISO 9000 if it is used for stimulating internal improvements (i.e. for increasing productivity, efficiency, management control, definition of responsibilities and tasks, and employee motivation) (Gotzamani and Tsiotras, 2001; Mcadam, 1999). Moreover, ISO 9000 should be considered a long-term investment that requires continuous effort and employee involvement (Mcadam, 1999).

2.16 Chapter summary

This chapter covered several aspects that are essential to LS, in order to develop the LR framework and identify how to implement it in K-SMMIs. In order to understand the essential requirements of LS the chapter studied the Toyota system, lean principles, lean requirements, CSFs, and the eight wastes associated with LS, as well as their sources, in order to facilitate an understanding of the key aspects of LS. After understanding the above-mentioned issues, the chapter considered the LS assessment frameworks and models developed by several researchers, which will help in designing this research’s framework.

QI and LS within SMEs have been studied in this chapter in order to draw a clear picture of lean implementation within SMEs. Following this, quality management in the Kuwaiti context was studied so as to identify the potential barriers that may delay the implementation of QI.

The literature revealed several factors and issues that can inhibit LS implementation, and several essential aspects that need to be taken into account to start LS. These factors are the bases of LS; in order to be ready for LS, organisations
need to consider these factors, as without them LS cannot be established or sustained. Based on the previous research, the required factors for starting LS were extracted, as follows:

- **Internal soft issues**
  - HR: empowerment, communication, incentive and reward, suggestion, training, skilled and multi-tasked workers.
  - Top management commitment and leadership: visible management, providing support, investment in training and expertise, and leading by example.

- **Internal technical issues**
  - Process layout (equipment): grouped equipment and items, production based on customer demand.
  - Planning and control: problem solving, standardising work, and VM

- **External issues**
  - Customer involvement: involvement, feedback (such as dealing with complaints), understanding customers by building strong relations, and mutual trust
  - Supplier involvement: reducing number of suppliers, quality suppliers, mutual trust and long-term relations.

With regard to the Kuwaiti context, the literature highlights some potential obstacles and barriers that could contribute to impeding the K-SMMIs from adopting LS. Some of those inhibitors include the business environment, which precludes new entrants from entering the Kuwaiti market as well as preventing Kuwaiti people from establishing their businesses, and has in turn resulted in low FDI.

Managerial and leadership issues also appeared to be aspects that might prevent K-SMMIs from adopting LS. Despite the fact that Kuwait is one the most open countries in the GCC region, previous research shows that the dominant management style is a “one man show” that is not very supportive towards LS, as LS requires a certain type of management that encourages involvement, empowerment and respect by allowing everyone to express their opinions and ideas and by providing a reward and training system to encourage people to work to the maximum level. Furthermore, traits that have been found to be instilled in the Kuwaiti culture,
such as nepotism and favouritism for promoting and hiring people, have endorsed corruption.

Moreover, the literature shows that financial aspects are not key in delaying the development of SMMIs; more inhibitive are the lack of attention and strategies from the government to make this sector active. Finally, it has been shown that Kuwait relies heavily on foreign workers, which helps to delay development as a high percentage of workers are unskilled and poorly educated; even skilled works often perform jobs that are not related to their specialties, as the Kuwaiti government does not allowing foreign workers to move freely from one job to another, unless they have permission from their Kuwaiti guarantor.

Furthermore, the literature highlights several quality and management practices adopted by Kuwaiti firms, mainly large ones, but these have not been adopted efficiently, while quality and management practices within SMEs seem to be very modest.

If close consideration is paid to the potential problems in Kuwait that may contribute negatively towards development of K-SMMIs, it is clear that most come from similar sources, which include lack of strategy and mainly arise as a result of the national culture. Further, most of those factors contrast lean philosophy. Thus, this research study aims to identify how these factors are related to K-SMMIs, and how they delay K-SMMIs’ improvement.
Chapter Three  Development of the LR framework

3.1 Introduction

Prior to the development of the LR framework, a great deal of literature was reviewed to demonstrate what key practices are required for LS to be established; Figure 1 shows the stages for developing the LR framework. Further, this chapter explains the rationale behind the development of the LR framework. Each element of the LR framework is explained and highlighted. It also includes an explanation of each category and element, and why they are important for LS.
Figure 1 Stages for developing the LR framework
Table 11 summarises the essential factors for LS and other QI that have been addressed by different researchers, and have used in this study to identify the readiness of K-SMMIs towards LS. In the section that follows, a description will be provided of how the readiness of K-SMMIs towards LS is measured based on the six key areas (drivers).
<table>
<thead>
<tr>
<th>Factors</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</td>
</tr>
<tr>
<td>Management commitment and leadership</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Suppliers</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Customers</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Training and skilled people</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Communication (employee/department) and teamwork</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Involvement, participation and empowerment</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Motivation, reward, recognition and incentive</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Expertise</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Financial</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Strategy and vision</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
<tr>
<td>Culture</td>
<td>* * * * * * * * * * * * * * * * * * * * * * * * *</td>
</tr>
</tbody>
</table>

3.2 Importance of assessing the organisational readiness

Organisational readiness is a key factor in the success of lean [journey]. This includes generating a vision of a fully integrated Lean organisation at the outset of implementation; being realistic about the timescales involved in making changes and embedding the process; engaging staff and helping them to understand how the Lean approach may impact upon the organisation and; evaluating the degree to which a process and customer view already exist within the organisation. (Radnor et al., 2006, p. 4)

Holt et al. (2007, p. 290) stated that:

By assessing readiness for change, change agents, managers, human resource management professionals, and organizational development consultants can identify gaps that may exist between their own expectations about the change effort and those of other organizational members.

Furthermore:

The readiness for change [towards lean] can be addressed by identifying and understanding the need for change, having clear and consistent leadership and direction, and creating a strong change agent team. (Nordin et al., 2012b, p. 862)

Although many researchers have mentioned the importance of organisational readiness before implementing LS (e.g. Nordin et al., 2012a; Radnor et al., 2006), none have developed a framework or model to show how readiness can be assessed before lean implementation. One of those who addressed the importance of readiness is Radnor et al. (2006, pp. 65-66), who identified potential dimensions for organisational readiness towards LS in a study on the Scottish public sector, including: acceptance of need to change, capacity for improvement, team working, supportive culture, understanding the customers, process-based view, and improvement data.

3.3 Measurement framework

As mentioned in the literature review, many measurement frameworks have appeared in the literature to date (Furlan et al., 2011; Shah and Ward, 2007; Shah and Ward, 2003; Mady, 2009; Anad and Kodali, 2009; Nordin et al., 2010; Goodson,
Furthermore, many articles relating to lean assessment measurement tools and frameworks have been developed by leading organisations, such as Industrial Solutions Inc., Lean Enterprise Inc., and StratergosInc. Other assessments include Lean Self-Assessment Throughput Solutions, the Shingo Assessment, and the Sai Global Assessment.

According to Jaitly et al. (2008), most of these measurement frameworks follow the same logical pattern in terms of structuring the parameters and asking questions; however, the frameworks are not free from criticism. Their weaknesses include a lack of structure in terms of questions and parameters; a failure to relate to the LS wastes in question; repetition of parameters/questions, which may lead to misunderstandings; inappropriate weights given to parameters, which do not always reflect their importance; too much emphasis on lean tools, and not enough on the roles of the people involved; questions that are too complex; and tools that are too bulky.

The lean concept is new to K-SMMIs, as mentioned above, and no studies have been carried out to date that show the suitability of LS in the Kuwaiti context. Thus, in order to fill this gap, this exploratory study aims to assess LR within K-SMMIs.

3.4 Lean readiness measurement framework

The assessment tools used in this study are inspired by frameworks set forth by Mady (2009), Shah and Ward (2007), Nordin et al. (2010) and Anad and Kodali (2009). These frameworks follow similar principles to assess the quality and management practices in firms; however, the frameworks can’t be used as they stand as none of them include top management, which is an essential factor, and all of them have been designed for firms who have already implemented LS/QI, which is not the case in this study.

This study does not aim to assess the leaness of firms, but rather to evaluate their quality and management practices and see whether K-SMMIs have the capabilities to implement LS; therefore, following the exact principles of the above-mentioned frameworks may lead to negative results and confuse the respondents.
There are also inconsistencies in terms of LS definitions in the extant literature, which leads to misunderstandings regarding the real benefits of LS, and, in turn, knowing whether a firm has what it takes to implement LS (Pettersen, 2009).

Thus, it has been decided to use simple questions which will form a basis from which to implement lean tools such as 5s, VM, problem solving, empowerment, etc.

The LR framework consists of six categories (key drivers) containing 47 elements (see Appendix-A and B for the questionnaire items) that were developed based on discussions with a panel of experts including academics from Kuwait University and Portsmouth University, as well as an extensive literature review focusing on the technical and cultural requirements of LS, CSFs for LS, and elements associated with the eight wastes (defects, overproduction, waiting, overprocessing, transportation, inventory, motion, and unused employee creativity) which LS works to eradicate, and finally by reviewing Toyota’s system in terms of how it implemented its CI and promotes respect of people, and by understanding the Toyota culture. This framework tries to overcome the weaknesses outlined by Jaitly et al. (2008) by associating the questions with lean wastes, placing less stress on LS, and concentrating more on the practices that complement the implementation of LS, rather than the tools themselves.

Furthermore, this framework targets the whole chain of LS, from suppliers, through internal processes/practices, and finally to customers. This should make it possible to understand how K-SMMIs operate in terms of supplier and customer relations, process flows, the use of scientific tools to deal with problems, CI, top management commitment and leadership, and finally respecting people via involvement, empowerment, reward systems and training. The technical and cultural requirements for LS that have been found in the literature are outlined below (Categories 1–6), with special emphasis paid to the aspects suggested by Bhasin and Burcher (2006).
3.4.1 Category 1: Processes

Process management is one of the most important factors in terms of identifying non-value-adding activities and increasing quality. Ineffective processes lead to more waste and lower productivity per employee (Zhang et al., 2000; Goodson, 2002; Gotzamani and Tsiotras, 2001; Lewis et al., 2006).

A total of 12 questions were included in this category to evaluate the firms’ practices with respect to whether they support lean practices in terms of process flow, housekeeping, production rate, cycle time, TPM, flow of material, designated area and labelled items. Table 12 shows the key areas covered in this category.
## Table 12 Process – critical practices

<table>
<thead>
<tr>
<th>Processes</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
</table>
| Housekeeping (5s)                      | • The workplace must be tidy and well organised.  
• Items and equipment should be labelled to ensure that they are located in the right zone.  
• The organisation needs to have an auditing routine to ensure that every item is returned to where it belongs so that it can be found easily if needed to avoid “motion wastes”. | 6, 12, 13, 14, 16, 18, 19, 22, 46 |
| Cellular manufacturing                 | • The processes should be designed to help the flow, so equipment/items must be placed where they are needed and processes using similar activities should be conducted close to each other to help eliminate unnecessary movement.                                                                                      | 6, 12, 14, 16, 18, 22, 46 |
| Skilled workers running and leading the process | • Each process should be operated by qualified people.                                                                                                                                                                                                                                                                             | 12, 14, 16, 18 |
| Total Productive Maintenance (TPM)     | • Routine maintenance should be performed by skilled people.  
• Equipment records should be shown on the shop floor, to avoid confusion and to keep employees up to date, which will mitigate the risk of equipment breakdown.                                                                                                          | 4, 13, 16, 18, 19 |
| Documentation                          | • The organisation should have a well-documented system that includes machine settings and any information needed to change these.  
• In order to improve, the organisation should revise the cycle time for each process on a regular basis.                                                                                                                                                                   | 2, 16        |
| Production based on pull               | • Production should be based on external and internal customer demand.                                                                                                                                                                                                                                                           | 18           |

3.4.2 Category 2: Planning and control

Many authors (e.g. Chin and Pun, 2002; Gotzamani and Tsiotras, 2001; Lewis et al., 2006; Goodson, 2002) have highlighted the importance of this factor. According to Chong and Rundus (2004), the use of quality control systems and scientific methods to solve problems, as well as VM, help to ensure CI as it is key for enhancing the firm’s performance and eventually leads to higher levels of customer satisfaction.

This category consists of five questions, with the aim of shedding light on quality and management practices in terms of VM, a scientific method for solving problems, focus groups, benchmarks, etc. Table 13 shows the areas covered in this category.
Table 13 Planning and control – critical practices

<table>
<thead>
<tr>
<th>Planning and control</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving</td>
<td>• Using problem-solving techniques is key to helping the organisation with respect to CI. Problem solving needs skilled people and involvement and should be conducted as a group, which in turn will help to reduce waste within the organisation.</td>
<td>6, 18, 22, 44</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>• In order to improve, the organisation needs to be aware of its competitors. Benchmarking performance against other top-class industries will allow the organisation to understand any threats from competitors, which could drive improvement.</td>
<td>29, 34, 35, 36, 37, 45</td>
</tr>
<tr>
<td>Standardised activity</td>
<td>• In order to avoid misunderstanding regarding work processes and procedures, which could result in waste, the organisation should implement standards such as specific routes for loading raw materials and removing end products, and standard picking time.</td>
<td>12, 16, 35, 45</td>
</tr>
<tr>
<td>VM</td>
<td>• Managing the workplace visually is highly recommended by LS as it can help to keep the process smooth and reduce defect rates; this can take many forms, such as showing the defect rate, key performance indicators, next job activity, etc.</td>
<td>18, 43, 47</td>
</tr>
</tbody>
</table>

3.4.3 Category 3: Customer relations

As highlighted by many authors (Zu et al. 2010; Golicic and Medland, 2007; Panizzolo, 1998; Meredith et al., 1991; Goodson, 2002), maintaining happy customers is the aim of any company, since all departments are ultimately working to satisfy their customers’ needs. To this end, the company must understand its customers’ requirements (Zhang et al., 2000; Found and Harrison, 2012). Moreover, the organisation needs to respond quickly to customer complaints. According to Anvari et al. (2011), LS will not be applicable if the customer demands are unstable or unpredictable, so they organisation must have close relationships with its suppliers.

There are eight questions under this category, which aims to identify the level of awareness about customers in terms of understanding them, identifying the level of customer involvement and participation, and dealing with customer complaints. Table 14 shows how the organisations’ customer relations were measured.
Table 14 Customer relations – critical practices

<table>
<thead>
<tr>
<th>Customer relations</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the customer</td>
<td>The organisation must understand its customers’ needs and requirements and ensure production is in line with customers’ orders and demands, as LS is about creating the value that customers are willing to pay for, with any excess considered waste.</td>
<td>7, 18, 29, 30</td>
</tr>
<tr>
<td>Customer involvement</td>
<td>The organisation needs to build a relationship with its customers in order to understand them. This can be done by involving them in product design, which will ensure that they will be willing to pay for the product.</td>
<td>7, 18, 22, 30</td>
</tr>
<tr>
<td></td>
<td>In order for the company to produce based on customer demand (pull and JIT) strong relations and mutual trust must be built with customers.</td>
<td>7, 8, 30</td>
</tr>
<tr>
<td></td>
<td>Customers’ complaints need to be taken seriously to avoid future mistakes and to retain the customer base.</td>
<td></td>
</tr>
<tr>
<td>Customer feedback</td>
<td>To retain customers, the organisation should involve them and use their feedback and suggestions.</td>
<td>7, 18, 29, 30</td>
</tr>
</tbody>
</table>

3.4.4 Category 4: Supplier relations

Again, this factor has been mentioned in many articles (Zu et al., 2010; Golicic and Medland, 2007; Panizzolo, 1998; Meredith et al., 1991). Quality suppliers enable companies to produce quality products (Zhang et al., 2000); this is important in LS, as the long-term relationships with suppliers will enable the company to perform JIT, which is essential for LS (Dayton, 2001; Found and Harrison, 2012).

In this category there are eight questions, which aim to identify the quality of the companies’ suppliers, the number of suppliers they work with, the suppliers’ involvement, and the companies’ long-term relations with its suppliers. According to Taj (2005), having fewer suppliers and long-term relationships with them, and making suppliers’ part of the firm’s team, is healthy and essential for LS. Table 15 shows the items used in this research to identify how the K-SMMIs deal with suppliers.
### Table 15 Supplier relations – critical practices

<table>
<thead>
<tr>
<th>Supplier relations</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality suppliers</td>
<td>• The quality of suppliers is very important for LS. Quality means providing goods on time, without a need for further inspection. To this end, the organisation should have a clear strategy to deal with suppliers.</td>
<td>18, 22, 29, 48, 49</td>
</tr>
<tr>
<td>Supplier location</td>
<td>• This aspect is very important, as many authors suggest dealing only with suppliers in close proximity to enable them to perform JIT manufacturing effectively.</td>
<td>3, 18, 50</td>
</tr>
<tr>
<td>Number of suppliers</td>
<td>• Many authors have emphasised dealing with small numbers or a single supplier for each item, as this will help in building long-term relationships with suppliers, and in turn will make suppliers more committed to supplying quality products and providing JIT delivery.</td>
<td>18, 51, 52, 53</td>
</tr>
<tr>
<td>Supplier relationship</td>
<td>• Maintaining long-term relationships with suppliers is essential in LS, as it will reflect positively in supplier performance and in terms of finances. Many authors have stressed the importance of relationships with suppliers as it is a critical factor for lean implementation, and is essential for JIT manufacturing.</td>
<td>7, 17, 18, 20, 23, 48, 49</td>
</tr>
<tr>
<td>Supplier involvement</td>
<td>• It is highly recommended to involve suppliers in area, such as product design and development, inventory management, etc. This could help organisations to improve the quality of their products.</td>
<td>18, 22, 49</td>
</tr>
<tr>
<td>Supplier feedback</td>
<td>• Shah and Ward (2007) emphasised providing suppliers with regular feedback on delivery and the quality of products, as this will help to improve the relationship and avoid mistakes in the future.</td>
<td>18</td>
</tr>
</tbody>
</table>

3.4.5 Category 5: HR

Training, empowerment, involvement and recognition are important factors in terms of LS success (Kumar et al., 2009; Zu et al., 2010; Mefford, 2009; Zhang et al., 2012; Goodson, 2002), and are required in order to produce high-quality products. Employees are the core of the company, and therefore need to be encouraged and involved in company strategy and direction, especially when implementing LS. Without skilled workers, LS will not last (Tsang and Antony, 2001).

This category contains 11 questions, and aims to evaluate the level of employee involvement, training, empowerment and teamwork, as well as incentive and reward systems, communications between employees and communications between departments. This category represents the core of LS, as many authors and researchers have stressed the role of HR. Table 16 shows the items and key areas tested in this research.
<table>
<thead>
<tr>
<th>HR</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement and participation</td>
<td>• Involvement and participation have been emphasised in the literature, since LS requires everyone in the organisation to be involved by providing suggestions to improve the system; to do this, employees need to be aware of their roles in the organisation, as well as having the right skills.</td>
<td>8, 18, 22, 23, 29, 35, 38, 46</td>
</tr>
<tr>
<td>Skills and multi-skilled workers</td>
<td>• Workers need to be skilled to participate in improving the system and to contribute to problem solving; further, LS requires multi-skilled people that are able to perform different tasks.</td>
<td>1, 4, 12, 13, 14, 16, 20, 22, 23, 24, 41, 43, 46</td>
</tr>
<tr>
<td>Training</td>
<td>• In order to perform different tasks and contribute to problem solving, workers need to be trained in problem solving and cross-trained in different sections of the company.</td>
<td>3, 8, 11, 18, 21, 22, 24, 27, 28, 35</td>
</tr>
<tr>
<td>Motivation</td>
<td>• Motivation is essential to encourage people to participate and provide new ideas; workers need to be highly motivated and rewarded for their efforts, and this can done via empowerment and by having a clear rewards system and incentives.</td>
<td>4, 12, 14, 16, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 35, 40, 43, 46</td>
</tr>
<tr>
<td>Communication</td>
<td>• Effective communication between employees and departments is essential. Without it, LS cannot be successful, since communication enables workers to understand their job requirements and avoid conflict with other departments (for example, there has to be communication between the sales and production department, since the sales department needs to understand the capacity of the production department). This could save the organisation time and money.</td>
<td>6, 17, 21, 23, 26, 28, 33</td>
</tr>
<tr>
<td>Teamwork</td>
<td>• Teamwork is needed in LS, as it will help employees to share knowledge and ideas. According to Ichimura et al. (2007), teamwork helps to improve work by providing suggestions to develop processes, and is essential for CI. It also creates challenges between workers, which can serve to motivate them.</td>
<td>6, 17, 22, 23, 29, 33, 35, 43</td>
</tr>
</tbody>
</table>

3.4.6 Category 6: Top management and leadership:

The level of top management commitment and leadership is crucial for LS. This commitment is manifest in many forms, such as providing clear vision, allocating resources and funding, and providing strategic leadership (Tsang and Antony, 2001). To ensure the success of LS implementation, it is essential for top management to create a quality culture by empowering other employees (Zhang et al., 2000). This factor has been emphasised in various articles (e.g. Chin and Pun, 2002; Angelis et al., 2011; Bakås et al., 2011; Zu et al., 2010; Mefford, 2009; Kumar et al., 2009; Achanga et al., 2006; Panizzolo, 1998; Meredith et al., 1991; Snee, 2010).

This category contains five questions that aim to identify the level of top management commitment in terms of appearance in the working area, locating the right people in the right place, providing job security, investing in consultancy and expert advice, and investing in training. Without top management and leadership commitment, LS implementation will not succeed. Table 17 summarises the items highlighted in this category.
Table 17 Top management and leadership – critical practices

<table>
<thead>
<tr>
<th>Top management and leadership</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
</table>
| Visible management                                 | • It is essential in LS for top management to be visible in the workplace to motivate people.  
• Top management must be motivated and committed towards improvement, as this will stimulate their workers.                                         | 17, 21, 23, 33, 39, 40, 46 |
| Investment and commitment to improvement          | • LS requires investments in training, consultancy and hiring experts to improve the work, and this entails commitment from managers and leaders who believe in improving the system.           | 1, 3, 5, 7, 8, 9, 10, 11, 17, 23, 27, 28, 32, 33, 35 |
| Knowing people’s capabilities                      | • In order to get the best from people, the organisation needs to understand their capabilities and assign them to jobs that best match their skills.                                              | 1, 11, 46            |
| Job security                                       | • One of the main values of Toyota is their “lifetime employment policy”. This practice helps to build trust between the company and its employees, and encourages people to be more committed and loyal to the company. As a result, employees will attempt to improve every day. Toyota believes that providing job security will unleash employee creativity and improve their ability to work. | 9, 15, 54            |

Most of the practices outlined above rely on human efforts and participation; thus, it is essential to keep workers motivated, and this motivation can be achieved through empowerment, rewards and incentives, and involvement. Though not all of the practices above are prerequisites of LS, they can be said to represent essential aspects of LS. This means that it is necessary to consider them in order to understand K-SMMIs’ LR.

3.5 Development of the research hypotheses

As this study is the first of its kind, it aims to describe K-SMMIs in terms of the quality and management practices deployed by different industries, and to explore which of them has the best foundation for LS. To this end, five hypotheses have been developed by which to evaluate readiness for LS in firms who have not yet started LS, and to learn how to distinguish between these firms; i.e. to know if ISO 9000-accredited firms have better readiness towards LS, and learn whether the firm structure (family vs. non family), size and sector affect readiness towards LS.

3.5.1 Hypothesis 1

The literature shows that 254 Kuwaiti organisations practise ISO 9000 (ISO, 2008a). Further, ISO 9000 can help the companies to start other QI such as LS (Ho, 1994; Lee, 1999; Sun, 2000; Magd, 2006; Gotzamani and Tsiotras, 2001; Chiarini, 2011b).

From the ISO 9000 literature in the previous chapter, it is expected that ISO 9000-certified firms in Kuwait will have better quality and management practices in place, and therefore a higher level of lean readiness. Thus, hypothesis one (H1) is as follows:

\[ H1: \text{There is a significant difference in the quality and management practices used by ISO 9000 firms compared to non-ISO 9000 firms in Kuwait.} \]

3.5.2 Hypothesis 2

This hypothesis has been developed to see whether differences in size will have an impact on LS readiness within Kuwait industries. The literature contains
many arguments that insist on the applicability of LS to SMEs; for instance, as some authors (e.g. Ghobadian and Gallear, 1997; Oviatt and McDougall, 1994; Karlsson and Åhlström, 1997; Ahire et al., 1996; Haksever, 1996) have suggested, the smaller size of these organisations means that they can better manage their resources. On the other hand, some researchers have suggested that LS works better in large organisations due to availability of the resources required by LS.

In this sense, applying the above premises to the Kuwaiti context, hypothesis two (H2) is as follows:

\[ H2: \text{Small firms and medium-sized firms in Kuwait differ significantly in terms of their quality and management practices.} \]

3.5.3 Hypothesis 3

Sector has not been emphasised as a factor that affects LS, as many authors have suggested that LS can apply to many different types of industries (Womack et al., 1990; Soriano-Meier and Forrester, 2002). In previous studies (e.g. Prajogo, 2005; Pino, 2008; Woon, 2000; Talib et al., 2011; Huq and Stolen, 1998), researchers have attempted to distinguish between QI practices across different sectors, but the main focus has been on the manufacturing and services industries rather than different manufacturing sectors; i.e. there are no studies that differentiate between the applicability of LS or QI to different types of manufacturing industries, such as paper, plastic, metal, etc.

Many researchers (e.g. Reed et al., 1996; Corbett and Rastrick, 2000; Curkovic et al. 2000) have shown that different quality and management practices are used in different industries, depending on the activities of firms due to the uniqueness of their business, as different industries may have different needs. Mady (2009) showed that there is a difference in TQM usage between the food and refractor sectors. Thus, the third hypothesis has been developed as follows:

\[ H3: \text{Firms in different sectors in Kuwait differ significantly in terms of their quality and management practices.} \]
3.5.4 Hypothesis 4

The literature shows that there is a difference between family- and non-family-owned businesses. Several authors (e.g. Ward, 1988; Cooper et al., 2005; Ellington et al., 1996; Hofer and Charan, 1984; Levinson, 1987) have found that non-family-owned businesses are more successful in implementing QI as they have certain characteristics that family businesses do not have, or are not willing to compromise on.

Other researchers (e.g. Welsh and Raven, 2006; Chua et al., 1999; Davis, 1983) believe that family businesses are better able to manage their resources, especially in terms of customer relations and organisation stability. Therefore, the fourth hypothesis is as follows:

\[ H4: \text{There is a significant difference in the quality and management practices used by non-family-owned firms compared to family-owned firms in Kuwait.} \]

Once again, it is worth mentioning that this study is the first to deal with LS in the Kuwaiti context, so it is necessary to build a foundation from which to obtain a better understanding of Kuwaiti firms. Thus, the above hypotheses have been developed to identify which K-SMMIs have better readiness towards LS, and by distinguishing the firms according to four categories – i.e. ISO 9000-accredited firm, size of the firm, firm activity (sectors) and ownership of firms – it will then be possible to identify whether these factors have an effect on readiness towards LS.

3.5.5 Hypothesis 5

After reviewing the literature, especially with regards to the Kuwaiti context, many aspects have been identified that do not support LS. For example, the management and leadership style in Kuwait is based on a “one man show” approach; there is little respect for empowerment and delegation, and a lack of strategies and awareness of QI and of governmental support; the role of K-SMMIs within the economy is modest; there is a lack of skilled people to run the business, both at managerial and shop-floor level; etc. These inhibitors affect LS. Thus, the final hypothesis has been developed as follows:
H5: K-SMMIs are not using quality and management practices to a very significant extent.

3.6 Chapter summary

This chapter explained how the LR measurement framework was developed and showed how each element in the questionnaire was developed. Further, the hypotheses have been explained.
Chapter Four       Methodology

4.1 Introduction

This chapter describes the methodology employed to help answer the research questions, by testing the hypotheses to meet the objectives of the study. Moreover, it outlines the research philosophy, research approach, choice of methodology, research strategy and finally the techniques and procedures used to conduct the data collection and analysis. Additionally, this chapter justifies the chosen research method by highlighting the key features, weaknesses and strengths of different approaches and methods.

The chapter explains the process followed to collect the required data, and outlines the reasons behind the choice of certain methods, techniques and approaches. Furthermore, it shows how the difficulty of obtaining respondents was overcome and how any potential bias was mitigated. Several tactics have been followed in this study to enhance the validity and reliability of the outcome, such as triangulation, pilot testing and consulting with an expert panel.

Researchers and authors have used many definitions in the literature to define and describe research methodology and the research process. Hussey and Hussey (1997) defined research methodology as the entire process covered in a particular study. Clough and Nutbrown (2007) defined research as a process of investigating and studying an issue or phenomenon. Leedy and Ormrod (2001) defined research as an organised process of collecting, analysing and interpreting data to understand an issue or phenomenon. Saunders et al. (2009) defined research as a process of collecting data in a systematic fashion and then interpreting it in a way that helps the researcher to answer the research question and meet the objectives of the research. So the characteristics of research are:

1. Collecting data systematically;
2. Interpreting data systematically; and
3. Having a clear purpose for collecting and interpreting the data.
The prime objective of a research project is to answer particular research questions (Yates, 2004). According to Saunders et al. (2009), the research process can be symbolised as an onion, the layers of which need to be peeled off to reach the core, which is data collection and data analysis. So the process consists of six layers, as can be seen in Figure 2, namely research philosophy, research approach, methodological choice, research strategy, time horizons and finally techniques and procedures.

![Figure 2 Research Process. Source: Saunders et al. (2009, p. 108).](image)

Most researchers plan their studies to enable them to answer the research questions and meet the objectives of their research. Then they choose the most appropriate method to collect the data, which is the core of the onion (Saunders et al., 2009). Crotty (1998) emphasised that the researcher needs to explain the reason behind choosing the data collection method adopted, and that the explanation should be based on the outer layers of the onion, as Saunders et al. (2009) asserted.

This research adopted the above research process framework. The six layers are explained thoroughly in the following sections to allow the right decision to be made about the most appropriate method to help answer the research questions, establish the hypotheses and meet the aims of the study. Thus, this chapter discusses
and explains the above-mentioned methodologies and provides a justification for choosing them.

The prime aim of this research was to identify the factors that are affecting the readiness to adopt LS by describing the current practices within K-SMMIs to see how far they are from a LS and exploring the reasons behind it. In order to achieve the objectives of the study, it was decided to conduct it based on mixed methods (qualitative and quantitative).

A quantitative method (survey questionnaire) was used to assess the current practices in K-SMMIs and to see how far they are from LS. This gives an insight into how Kuwaiti firms are run before digging deeper using a qualitative method. Qualitative methods enabled evaluation of the readiness within K-SMMIs for LS by identifying the factors that are affecting and delaying the implementation of LS and other QI in Kuwaiti industries.

The qualitative strategy used in this research was based on case studies and was achieved by conducting semi-structured interviews with managers in K-SMMIs, academics from Kuwait University and experts from a consultancy companies to establish their views on K-SMMIs. Figure 3 illustrates the research methodology adopted in this research.
Figure 3 Research Methodology scenario
Before explaining the research methods and techniques adopted and used in this study, one thing needs to be clarified: most researchers and authors who have written about research methodology have used different definitions and terms to explain the research process, method and techniques. Thus, in order to be consistent in definition, the researcher has decided to stick with the terms used in Saunders et al. (2009), as many researchers and authors use these terms interchangeably.

The term “technique” in this research refers to a method used to collect and analyse data, such as an interview, observation or questionnaire; and the term “method” refers to qualitative, quantitative and mixed methods; while the term “methodology” as used in this research means the way in which the research should be conducted.

4.2 Purpose of the research

According to Robson (2002), the purpose of research could be exploratory, explanatory or descriptive. While research could have more than one purpose, that all depends on the research questions and what the research is trying to identify.

1. Exploratory: “what is happening; to seek new insights; to ask questions and to assess phenomena in a new light” (Robson, 2002, p. 59). According to Saunders et al. (2009), an exploratory purpose will help the researcher to understand the problem, especially when the researcher is not sure about the causes of the problem due to the lack of existing research and knowledge of the subject matter.

Saunders et al. (2009) have pointed out that researchers who opt to use exploratory research have to follow three principles: they need to review the available literatures; conduct interviews with experts in the subject; and hold focus group interviews. The good aspect of exploratory research is that it allows researchers to be more flexible.

Researchers using exploratory research normally start with a broad view of the problem, then narrow it down as the research progresses. According to Adams and Schvaneveldt (1991), that does not mean that the research does not have a clear direction; rather, it indicates the flexibility of exploratory research, as the researcher
begins with minimal knowledge due to the lack of existing knowledge of the subject matter.

2. Descriptive study: the main objective of a descriptive study is “to portray an accurate profile of persons, events or situations” (Robson, 2002, p. 59). The aim of a descriptive research study is to study the current situation to see what exists in the current state (Williams, 2007). Moreover, this kind of study can be done by conducting a survey.

3. Explanatory study: this type of study is where the researcher is trying to identify a relationship between variables in order to go beyond describing the phenomenon by analysis to see how and why it happens. In explanatory research, researchers have the authority to control the variables to see exactly how they affect a certain problem (Hussey and Hussey, 1997).

The latter type (explanatory) will not help in this research study, as the K-SMMIs have not experienced LS, so it is not possible to identify the variables that are affecting its implementation; rather, it is possible to envisage what factors could be potential barriers, obstacles or enablers for LS. Although in this study a hypothesis was developed, that was only to see whether firms with different characteristics (such as ISO 9000-certified firms, size, sector, management style etc.) have a better chance of implementing LS or not.

Based on the above explanations of the purpose of research and due to the nature of the research questions and the fact that there is no information with regard to LS in the Kuwaiti context and very little information about quality management in Kuwait, the purpose of this study is exploratory and descriptive in nature, as it aims to explore the current situation of K-SMMIs and how far that is from LS. Furthermore, it aims to explore the reasons that are hindering or delaying LS or might have the potential to prevent K-SMMIs from adopting LS. Table 18 shows the purpose of the research.

Table 18 Research methodology characteristics.
Source: Runeson and Höst (2009).

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Purpose</th>
<th>Primary data</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey</td>
<td>Descriptive</td>
<td>Quantitative</td>
<td>Fixed</td>
</tr>
<tr>
<td>Case study</td>
<td>Exploratory</td>
<td>Qualitative</td>
<td>Flexible</td>
</tr>
</tbody>
</table>
In addition, the prime aim of this study is to look for hypotheses and ideas, rather than testing hypotheses to help provide guidance for future research. Moreover, the researcher’s focus in being exploratory and descriptive is to be familiar with and gain an insight into K-SMMIs’ situation to enable a more rigorous investigation at a later stage, as this may give guidance for future research (Hussey and Hussey, 1997).

### 4.3 Research questions

Table 19 shows the research questions of this study and demonstrates the way in which the paper aims to answer each question in terms of target respondents, method, strategy and techniques employed.
<table>
<thead>
<tr>
<th>Research question No.</th>
<th>Research question</th>
<th>Target respondent</th>
<th>Method used</th>
<th>Strategy and technique(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1</td>
<td>How far are K-SMMIs from a lean system?</td>
<td>K-SMMIs, case study and expert</td>
<td>Quantitative and qualitative</td>
<td>Survey questionnaire and structured observation</td>
</tr>
<tr>
<td>RQ2</td>
<td>What factors relating to quality and management practices inhibit K-SMMIs from adopting a lean system?</td>
<td>K-SMMIs and expert</td>
<td>Quantitative and qualitative</td>
<td>Survey, case studies, semi-structured interview</td>
</tr>
<tr>
<td>RQ3</td>
<td>Why has a lean system not been practised within K-SMMIs to date?</td>
<td>K-SMMIs and experts</td>
<td>Qualitative</td>
<td>Semi-structured interview</td>
</tr>
<tr>
<td>RQ4</td>
<td>What is the urgency for K-SMMIs to adopt a lean system?</td>
<td>K-SMMIs and expert</td>
<td>Qualitative</td>
<td>Semi-structured interview</td>
</tr>
<tr>
<td>RQ5</td>
<td>What is the level of awareness of lean systems within K-SMMIs?</td>
<td>K-SMMIs, case study and expert</td>
<td>Qualitative</td>
<td>Semi-structured interview and literature review</td>
</tr>
<tr>
<td>RQ6</td>
<td>What are the potential barriers and enablers for K-SMMIs to adopt a lean system?</td>
<td>K-SMMIs and expert</td>
<td>Qualitative</td>
<td>Semi-structured interview and literature review</td>
</tr>
</tbody>
</table>
4.4 Research process

In order to meet the objectives of the research, it is necessary to peel off the outer layers that are covering the core (Saunders et al., 2009). The sections below explain the six outer layers in detail and clarify the reason and justification behind choosing the approaches and techniques.

4.4.1 First-layer philosophy

This layer represents the researcher’s position in viewing the world in terms of the development of knowledge and the nature of that knowledge (Saunders et al., 2009). Many authors have stressed the importance of understanding the research philosophy, such as Easterby-Smith et al. (2004), declaring that understanding this layer is critical as it helps in clarifying the research design. This layer assists in understanding the research questions, the method and how to interpret the findings of the research, so it is crucial for the researcher to understand this layer (Crotty, 1998).

One of the main debates in the research paradigm is in relation to ontology and epistemology. Ontology is “concerned with the nature of reality” (Saunders et al., 2009, p. 110), while epistemology “concerns what constitutes acceptable knowledge in a field of study” (Saunders et al., 2009, p. 112). In the business management discipline there have been many arguments and discussions about epistemology and ontology and which research philosophy the researcher should adopt; the debate is mainly between two research philosophies, positivism and interpretivism. Guba and Lincoln (1994, p. 105) have asserted the importance of deciding which research paradigm (epistemology or ontology) to use before choosing the research method. They have claimed:

“Both qualitative and quantitative methods may be used appropriately with any research paradigm. Questions of method are secondary to questions of paradigm, which we define as the basic belief system or world view that guides the investigation, not only in choices of method but in ontologically and epistemologically fundamental ways.” (Guba and Lincoln, 1994, p. 105)
Saunders *et al.* (2009, p. 119) have explained four philosophies related to management research, as can be seen in Table 20: positivism, interpretivism, realism and pragmatism.

1. **Positivism**

According to Cooper and Schindler (2006), this philosophy is associated with the idea of objectivism; researchers adopting this approach are mainly evaluating the world with the help of objectivity. This philosophy is mainly used with a quantitative approach. Furthermore, this philosophy requires the researcher to conduct research based on a large sample and the data collection method is based on highly structured, large samples, measurement and a quantitative approach, although a qualitative approach can also be employed; the researcher’s own beliefs do not affect or influence the research study (Saunders *et al.*, 2009).

The aim of the positivist philosophy is to prove or disprove a hypothesis and it emphasises scientific method, statistical analysis and generalisation of the findings. Moreover, researchers in this position are trying to explain phenomena rather than understanding them (Mack, 2010).

2. **Interpretivism/constructivism**

In this philosophical position, the researcher understands the differences between humans, not objects (Saunders *et al.*, 2009). Mack (2010, p. 8) advocated this view and said: “Interpretivism’s main tenet is that research can never be objectively observed from the outside, rather it must be observed from inside through the direct experience of the people.”

According to Saunders *et al.* (2009), many researchers see this philosophy as appropriate to business management research. Researchers who adopt this position are trying to understand phenomena rather than explain them (Mack, 2010).

3. **Realism**

The main concern of this philosophy lies in the reality that already exists, where the reality is independent from the mind. There are two type of realism: direct realism, where the researcher believes that what he/she sees is true; and critical
realism, where the experience of the researcher is viewed as sensations (Sekaran and Bougie, 2010).

4. **Pragmatism**

Saunders *et al.* (2009, p. 109) said: “Pragmatism argues that the most important determinant of the research philosophy adopted is the research question. One approach may be ‘better’ than the other for answering particular questions.” This is consistent with the author’s view, as it will give the author more freedom in choosing the most appropriate methodology. Moreover, the pragmatic position will help the researcher to stay between two different paradigms; Tashakkori and Teddlie (1998) suggested that it is better for the researcher to avoid being in different philosophical positions.

Saunders *et al.* (2009) claimed: “if the research question does not suggest unambiguously that either a positivist or interpretivist philosophy is adopted this confirms the pragmatist’s view that it is perfectly possible to work with both philosophies”. Furthermore, Tashakkori and Teddlie (1998) said that a pragmatic position is employed largely because it avoids the researcher being involved in pointless debates about epistemology and ontology (in the concept of truth and reality), as they think that focusing on how to answer the research questions and the aim of the research is more important, which is what the pragmatist position allows the researcher to achieve. They claimed that it is important to “study what interests you and is of value to you, study in the different ways in which you deem appropriate, and use the results in ways that can bring about positive consequences within your value system” (Tashakkori and Teddlie, 1998, p. 30).

5. **Selected philosophy**

Due to the nature of this research, which is mainly about exploring, describing and trying to identify the factors that are affecting K-SMMIs’ readiness for LS by shedding light on current practices within K-SMMIs and how far they are from LS, data needs to be gathered from different resources to enrich understanding of the situation, since this is the first study in this field within the Kuwaiti context. The researcher had to adopt different methodologies; in that sense, the research philosophy is pragmatic. This pragmatism allows a concentration on the main target
of the study, which is answering the research questions. Table 20 shows the differences between the four philosophical positions in terms of ontology, epistemology and data collection.
Table 20 Comparison of research philosophies in management research.

<table>
<thead>
<tr>
<th>Philosophy</th>
<th>Ontology</th>
<th>Epistemology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivism</td>
<td>External, objective and independent of social actors</td>
<td>Observable phenomena can provide credible data, facts. Focus on causality and law-like generalisations, reducing phenomena to simplest elements</td>
</tr>
<tr>
<td>Interpretivism</td>
<td>Socially constructed, subjective, may change, multiple</td>
<td>Subjective meanings and social phenomena. Focus on the details of the situation, the reality behind these details, subjective meanings motivating actions</td>
</tr>
<tr>
<td>Realism</td>
<td>Objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)</td>
<td>Observable, phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create</td>
</tr>
<tr>
<td>Pragmatism</td>
<td>External, multiple, view chosen to best enable answering of the research questions</td>
<td>Either or both observable phenomena and subjective meaning can provide acceptable knowledge dependent on the research question. Focus on applied research, integrating different perspectives to</td>
</tr>
</tbody>
</table>
sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts help interpret the data

| Data collection technique | Highly structured, large samples, measurement, quantitative, but can use qualitative | Qualitative small samples, in-depth investigation | Quantitative or qualitative method can be chosen, the chosen method must fit the subject matter | Quantitative or qualitative mixed or multiple design |
4.4.2 Second-layer research approach

Deductive and inductive are the main approaches that researchers can use to conduct research. The deductive approach is associated mainly with quantitative methods, while the inductive approach is mainly associated with qualitative methods. According to Cavana et al. (2001), in the deductive approach the researcher starts by developing a theory, then formulates hypotheses, then collects and analyses the data and finally accepts or rejects the hypotheses, which will lead the researcher to possess empirical evidence of certain phenomena. In the inductive approach, the researcher starts with observing phenomena, then analyses a pattern and themes, then formulates a relationship and finally develops a theory (Cavana et al., 2001).

The differences between deductive and inductive approaches have been explained in Saunders et al.’s book (2009, p. 127); it has been found that the deductive approach is based on scientific principles, a need to explain the relationship between variables, and is a highly structured approach. The researcher needs to be independent, and in order to generalise the findings of the research the researcher has to select an adequate sample size.

In the inductive approach, the researcher will be able to have a deep understanding of the research by collecting data qualitatively, interacting with people, and use a more flexible structure where the researcher can change the research emphasis as the process progresses. The researcher is part of the research and finally is less concerned with generalising from the outcomes of the research.

In order to achieve the research objectives, in this study both inductive and deductive approaches have been considered when conducting the research. According to Hussey and Hussey (1997), researchers have the freedom to move from one approach to another. Saunders et al. (2009) have the same view, and assert that mixing both approaches in one piece of research would be beneficial to the study. The deductive approach was used in the first phase of the research. By reviewing the research literature several factors and facts were identified that might affect the implementation of LS within K-SMMIs; based on those factors a measurement
framework has been developed to measure the current practices and whether they match lean principles or not.

The inductive approach was used in the second phase of the research, as the researcher was interested in knowing the causes and effects of practices within K-SMMIs and how these could affect the introduction of LS to the industries visited.

4.4.3 Third-layer research strategy

There is a different form of research strategy in which the researcher can choose the best strategy or strategies to help them answer the research questions and meet the aim of the research (Saunders et al., 2009). Research strategies include survey, case study, experiment, action research, grounded theory and archival research.

Saunders et al. (2009) pointed out a number of factors that affect the choice of research strategies. What is most important is to choose the appropriate strategies that enable the researcher to answer the research questions and meet the research objectives. The strategy or strategies need to be consistent with the researcher’s philosophy, research approach and the purpose of the research. Moreover, the choice of research strategies could be influenced by other factors, such as the amount of knowledge available to the researcher, availability of time and required data, and the accessibility of the potential participants. Yin (2003) declared that there are many forms of research strategy, as shown in Table 21. However, the differentiation between strategies is subject to three factors: (1) the type of research questions; (2) the degree of control over events; and (3) the research focus if it is on historical or contemporary events.
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of research questions</th>
<th>Does it require control of behaviour events?</th>
<th>Does the research focus on contemporary events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>History</td>
<td>How, why?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case study</td>
<td>How, why?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This study has its focus on contemporary events and due to the exploratory and descriptive nature of this study, the researcher opted to go for survey and case study strategies, as the researcher is aiming to enrich his knowledge of the situation of K-SMMIs in terms of knowing their current practices and revealing the reasons behind it, which may affect positively or negatively the current practices in relation to LS.

1. **Survey**

A survey is one of the most popular strategies used in the business and management field (Saunders *et al.*, 2009). According to Yin (2003), a survey can help in answering questions such as who, what, where, how many and how much. This strategy is linked with the deductive approach and quantitative method. The main method of data collection for the survey strategy is the questionnaire, although there are more techniques such as structured observation and structured interview (Saunders *et al.*, 2009).

The major benefit of a survey is that it helps the researcher to generalise the findings at minimum possible cost; another advantage of the survey is that the researcher will be independent once he/she finishes collecting the data, unlike other
strategies that depend on other factors and information, and once the data is ready the researcher will be free to analyse the data that will help in answering the research questions and meet the main objective of the research (Saunders et al., 2009). Despite the privileges that the researcher can enjoy when adopting a survey strategy, there are some limitations and weaknesses. Remenyi (1995) has argued that the outcome of the survey could be shallow if it is compared with other strategies such as the case study. Robson (1993) says that this strategy might not be the most appropriate method for collecting data, especially in providing real-world accounts.

This strategy has been chosen in this study to understand the factors that are affecting the readiness for LS by establishing how far K-SMMIs’ current practices are from a LS and by measuring and shedding light on the key areas associated with LS that have appeared and been emphasised in the literature review, which will eventually reveal whether K-SMMIs are following the same principles or not.

2. Case study

A case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003, p. 13). Denscombe (2003) argued that a case study would allow the researcher to use different types of data with different resources to achieve the required information. Moreover, it would offer the researcher a rich understanding of the research context and the process (Morris and Wood, 1991). Robson (2002, p. 178) defined a case study as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence”.

There are various data collection techniques to be employed in a case study, such as interview (semi-structured and unstructured interview), observation and documentation analysis; in some cases a questionnaire can also be considered as part of the case study technique (Saunders et al., 2009).

The case study strategy was chosen in this research to complement and validate the main findings of the survey. The techniques used in the case study were semi-structured interview and observation. According to Saunders et al. (2009),
researchers who decide to adopt a case study are likely to combine more than one source of data to triangulate the findings and validate them. Additionally, this strategy was chosen to allow the researcher to understand in depth the reasons that might have prevented K-SMMIs from adopting LS, which might not be able to be identified through the survey questionnaire: “Survey approach provides only a ‘snapshot’ of the situation at a certain point in time, yielding little information on the underlying meaning of data” (Gable, 1994, p. 2/16). Another reason for adopting the case study alongside a survey is that if the survey alone was relied upon it would provide a snapshot of the situation, but would not demonstrate the causes and effects that are driving K-SMMIs to have this kind of practice (Gable, 1994).

According to Yin (2003), a case study is useful when the researcher is posing “why” and “how” questions, as it will allow the researcher to understand the reasons and motives behind adopting such an approach or not adopting another approach. In the present case it will make it possible to understand why K-SMMIs are running their business as revealed in the survey findings. Yin (2003) added that when the research is focusing on contemporary phenomena, the case study is an appropriate strategy to adopt: “case study is preferred in examining contemporary events” (Yin, 2003, p. 7). In this research the focus is on contemporary phenomena, to understand the current situation of K-SMMIs and to see how far they are from LS, and to focus on the factors that are affecting their readiness for LS.

According to Bardoel and Sohal (1999), the case study approach has gained momentum in identifying issues related to quality management, as it provides details and reveals information that other strategies such as a survey cannot provide (Mellahi and Eyuboglu, 2001). In addition to the above reasons, this is the first study of LS within the Kuwaiti context and a case study is appropriate in the development of this particular research area (Ben Jaber, 2010). Mellahi and Eyuboglu (2001) adopted the case study strategy, as they found that there is a lack of valid and reliable instruments to be used in developing countries, which is the same case in the present research.

The strength of the case study approach is that it allows the researcher to collect information from different sources and gain a “full variety of evidence –
documents, artifacts, interview, and observations” (Yin, 2003, p. 8). There are four types of case study strategies (Yin, 2003):

1. Single case study;
2. Multiple case study;
3. Holistic case study; and
4. Embedded case study.

A single case study is where the researcher needs to investigate a unique case; it is sometimes used where there is a case which no one or only a few people have come across before, so it can allow the researcher to observe and analyse a phenomenon. Multiple case studies are used when the researcher wants to generalise the findings from other case studies (Saunders et al., 2009). Voss et al. (2002) argued that, despite the fact that a single case study can offer deeper understanding, it has limitations, such as the fact that the findings of a single case cannot be generalised and there is a danger of bias and misjudgement; in order to avoid these weaknesses of a single case study, multiple case studies could be the solution, as they will provide more valid findings and attenuate the bias. Yin (2003) believes that multiple case studies are more beneficial for researchers than a single case study. Nevertheless, multiple case studies also suffer from some weaknesses, such as less attention by the researcher on the subject under study, which may lead to less in-depth information about the case; moreover, multiple case studies require more resources and time (Voss et al., 2002).

In this study multiple case studies have been conducted to allow to have a better picture and to see whether the findings from the survey match the firms visited. Furthermore, this will help to validate the overall findings of the study. However, there is no reference to guide the researcher to know how many cases should be taken into account for multiple case studies, as Perry (1998) pointed out. Voss et al. (2002) believe that the smaller the number of cases the better for the research, as far as in-depth findings are concerned. In that sense, this research has opted to go for two case studies as representative of the sample of 50 K-SMMIs, which will provide a better picture of current practices and to align the other findings from the survey to provide better validity and generalisability.
During the survey, the researcher asked respondents if they were interested to participate further in the research study and take part as a representative of K-SMMIs. Initial agreement was obtained from four firms, then two firms withdrew due to different reasons, such as time constraints and confidentiality. The researcher’s initial idea was to have four firms, two ISO 9000-certified firms and two non-ISO 9000-certified firms, but this was not possible.

The justifications behind the choice of these two firms were:

1. Both firms showed a desire to take part in the research;
2. Both firms were interested in LS and they thought it would be a good idea to obtain suggestions and to understand whether they were ready for LS; and
3. Both firms were ISO 9000 certified. The first firm had implemented ISO 9000 for five years and the second firm had implemented ISO 9000 for 4 years.

The case study strategy allowed the researcher to gain a better view and understanding of why K-SMMIs have yet to consider implementing LS; furthermore, it added validity to the findings from the survey.

4.4.4 Fourth-layer choice of method

According to Williams (2007), there are three methods for conducting a research study; quantitative, qualitative and mixed methods. Each of those methods has its own strengths and weaknesses. However, mixing methods (quantitative and qualitative) would enable the researcher to overcome and minimise the weaknesses of a single method (Johnson and Onwuegbuzie, 2004). Before choosing the method to be adopted in this research, the researcher thoroughly reviewed the weaknesses and strengths as well as key features of those methods to see which method would help to meet the objective of this research, bearing in mind the philosophical position of the researcher, which is pragmatism.

1. Qualitative and quantitative methods

Qualitative research is subjective in nature and is mostly aimed at understanding human and social behaviours (Collis and Hussey, 1997). It reflects on
perceptions by examining feelings and meaning (Kumar, 1999). This method is based in an inductive approach, as it emphasises the generation of theories, unlike the quantitative method. The main concentration in this method is on words, feeling and behaviours, without paying attention to numbers. Researchers who decide to adopt the qualitative method need to be aware that this method requires skill and time (Sharma, 2009). Yau and Steudel (2003) declared that the drawback of the qualitative approach is that it takes more time and a particular issue could be overlooked.

Patton (2002, p. 49) claimed: “Qualitative research is an effort to understand situations in their uniqueness as part of a particular context and the interactions there. This understanding is an end in itself, so it is not attempting to predict what may happen in the future necessarily, but to understand the nature of that setting – what it means for participants to be in the setting. The analysis strives for depth of understanding.”

On the other hand, the quantitative method involves the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute “alternate knowledge claims” (Creswell, 2003, p. 153). The quantitative method is based on a positivist philosophy and the deductive approach (Neuman, 1997). This method is objective, concentrating on measuring phenomena and/or testing theories (Hussey and Hussey, 1997). The data analysis associated with the quantitative method is a statistical procedure (Kumar, 1999).

In this research, the quantitative method will make it possible to understand the current practices in comparison to LS, but it would not reveal the reasons behind them; this is where the qualitative method comes in. Furthermore, the qualitative method would give participants the chance to open up new areas for researchers to help in understanding the situation, unlike the quantitative method in which participants respond to closed-ended questions. Table 22 shows the key features of quantitative and qualitative methods and Table 23 highlights the strengths and weaknesses of both methods.
Table 22 Key features of qualitative and quantitative research.
Source: Hussey and Hussey (1997, p. 54).

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Uses large samples</td>
<td>• Uses small samples</td>
</tr>
<tr>
<td>• Concerned with hypothesis testing</td>
<td>• Concerned with generating theories</td>
</tr>
<tr>
<td>• Data is highly specific and precise</td>
<td>• Data is rich and subjective</td>
</tr>
<tr>
<td>• Location is artificial</td>
<td>• Location is natural</td>
</tr>
<tr>
<td>• Reliability is high</td>
<td>• Reliability is low</td>
</tr>
<tr>
<td>• Validity is low</td>
<td>• Validity is high</td>
</tr>
<tr>
<td>• Generalising from sample to population</td>
<td>• Generalising from one setting to another</td>
</tr>
</tbody>
</table>

Table 23 Strengths and weaknesses of quantitative and qualitative methods.

<table>
<thead>
<tr>
<th></th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>• Quick and cheap</td>
<td>• Subjectivity</td>
</tr>
<tr>
<td></td>
<td>• Simple and offers a useful overview</td>
<td>• Requires skills for interpretation</td>
</tr>
<tr>
<td></td>
<td>• Helpful when used as a prelude to qualitative research</td>
<td>• Bias could be high</td>
</tr>
<tr>
<td></td>
<td>• Better accuracy</td>
<td>• Statistical accuracy can be reduced</td>
</tr>
<tr>
<td>Qualitative</td>
<td>• Detailed results and help to provide facts</td>
<td>• Slow</td>
</tr>
<tr>
<td></td>
<td>• Margin of error can be calculated</td>
<td>• Relatively expensive</td>
</tr>
<tr>
<td></td>
<td>• Good range for prediction</td>
<td>• More complicated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Low response rate</td>
</tr>
</tbody>
</table>
2. Mixed method

The mixed method is “an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including the standpoints of qualitative and quantitative research)” (Johnson et al., 2007). The mixed method is deemed to be the most appropriate method for doing research (Denzin, 1970; Bryman, 1988) and researchers who adopt the mixed method approach are likely to come out with superior results (Johnson et al., 2007).

Prior to designing and conducting the research, the researcher should know the best method to answer the research questions (Molina-Azorín, 2010). He or she also needs to be aware of the effort required to use the mixed method: it asks for a great deal of effort by the researcher as it demands extensive time, resources, effort and skills (Creswell and Clark, 2007; Molina-Azorín, 2010). Many researchers and authors have shown the benefits of adopting the mixed method, such as Molina-Azorín (2010); Creswell and Clark (2007); Patton (2002); and Tashakkori and Teddlie (2003). Creswell and Clark (2007) said that applying the mixed method would help researchers to have a better understanding of the research problem and complex phenomena. Moreover, it would add insights and better understanding, as well as enhancing the validity of the research and helping to reduce the problems that may come from a single method (Molina-Azorín, 2010). Table 24 shows the weaknesses and strengths of the mixed method that researchers need to know.
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed method research can answer a broader and more complete range of</td>
<td>A researcher has to learn about multiple methods and approaches and</td>
</tr>
<tr>
<td>research questions, because the researcher is not confined to a single</td>
<td>understand how to mix them appropriately.</td>
</tr>
<tr>
<td>method or approach.</td>
<td></td>
</tr>
<tr>
<td>A researcher can use the strengths of an additional method to overcome</td>
<td>Methodological purists contend that one should always work within either</td>
</tr>
<tr>
<td>the weaknesses in another method by using both in a research study.</td>
<td>a qualitative or a quantitative paradigm.</td>
</tr>
<tr>
<td>Mixed method research can provide stronger evidence for a conclusion</td>
<td>Some of the details of mixed method research remain to be worked out fully</td>
</tr>
<tr>
<td>through convergence and corroboration of findings.</td>
<td>by research methodologists (for example, problems of paradigm mixing, how</td>
</tr>
<tr>
<td>Mixed method research can add insight and understanding that might be</td>
<td>to qualitatively analyse qualitative data, how to interpret conflicting</td>
</tr>
<tr>
<td>missed when only a single method is used.</td>
<td>results and report them).</td>
</tr>
<tr>
<td>Mixed method research can be used to increase the generalisability of</td>
<td>Mixed method research can be difficult for a single researcher to carry</td>
</tr>
<tr>
<td>the results.</td>
<td>out, especially if the two approaches are expected to be used concurrently.</td>
</tr>
<tr>
<td>Qualitative and quantitative research used together produce more</td>
<td></td>
</tr>
<tr>
<td>complete knowledge necessary to inform theory and practice.</td>
<td></td>
</tr>
<tr>
<td>Researchers can generate and test a grounded theory.</td>
<td></td>
</tr>
<tr>
<td>Words, pictures and narrative can be used to add meaning to numbers.</td>
<td></td>
</tr>
<tr>
<td>Numbers can be used to add precision to words, pictures and narrative.</td>
<td></td>
</tr>
</tbody>
</table>
The mixed method could be adopted for different reasons. Swanson and Holton (2005) classified the mixed method into four types:

1. Complementary: where the results of qualitative and quantitative approaches are combined to complement each other;
2. Development: the results from one method help to develop the other method;
3. Initiation: where the results from one method are used to question the result from the other method; and finally
4. Expansion: where the researcher uses both methods to expand the range or breadth of the inquiry.

Researchers often adopt the mixed method for two reasons: to achieve validation or triangulation by combining different sources of data to study the same phenomenon, which enables them to have a complete understanding of it (Denzin, 1970); and to achieve complementary results by strengthening one method to boost the other method by overcoming weaknesses (Morgan, 1998). Moreover, Greene et al. (1989) mentioned that there are three main purposes of conducting the mixed method:

2. For triangulation purposes, to ensure validity by combining the results;
3. For complementary purposes, to enable the researcher to thoroughly explain the results of the analysis; and
4. For development purposes, to guide further data collection and analysis.

According to Carey (1993), qualitative and quantitative methods are simply tools that help the researcher to answer the questions that are very important to the research. These methods are often combined to produce the best research, although the fact that methods can be combined does not mean that doing so is always appropriate (Sale et al., 2002). Jick (1979) declared that qualitative and quantitative approaches must be viewed as complementary rather than rival methods.

Some researchers have claimed that both methods are based on different paradigms (ontology and epistemology) and that each method has a different philosophy and does not study the same phenomena, as the quantitative method is based on positivism while the qualitative method is based on interpretivism (Sale et al., 2002). However, Sale et al. (2002, p. 50) added: “the fact that the approaches are
incommensurate does not mean that multiple methods cannot be combined in a single study if it is done for complementary purposes”.

Creswell et al. (2011) share the same view as Sale et al. (2002) and say that the mixed method leads researchers to have diverse philosophical positions, as the mixed method requires researchers to use a quantitative methodology, which lies in a positivist philosophical position (and a mainly deductive approach), and a qualitative methodology, which takes an interpretivist philosophical position (mainly an inductive approach). Thus researchers need to be careful when deciding to use this method.

Many authors, such as Johnson and Onwuegbuzie (2004); Maxcy (2003); Rallis and Rossman (2003); and Johnson et al. (2007), have argued that a pragmatist philosophy is a greater partner to the mixed method, as it underpins the mixed method by providing assumptions about knowledge and inquiry. Moreover, researchers who are from a pragmatist philosophical position are not tied to one approach; rather, they will be focusing on the right methodology that helps them answer the aim of the research (Denscombe, 2008).

Many researchers switch from one method to another and the researcher’s choice of a specific method could be affected by many factors, such as time, money, resources, staff and the preferences of those requesting the study, so it does not necessarily reflect the researcher’s philosophical position (Schulze, 2003). Denscombe (2008) claims: “The choice of research methodology is seen as a reflection of factors such as career interests, funding opportunities, training, and personal skills rather than a purely ‘rational’ choice based on the respective merits of the available alternatives.”

Jick (1979) has encouraged researchers in the organisational management field to adopt a mixed method and triangulation, as it helps gain a better understanding of the subject and the researcher will be more confident of the results and interpretation. Jick (1979) stated: “[triangulation] can stimulate us to better define and analyze problems in organisational research”.

Gable (1994) has made a great comparison between a case study strategy and a survey strategy, which shows how the mixed method can be beneficial for the
research and that the weaknesses of one strategy are compensated by the strengths in the other strategy; see Table 25.

Table 25 Comparison between case study and survey.
Source: Gable (1994, p. 3/16).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Case study</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controllability</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Deductibility</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Generalisability</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Exportability</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Representability</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Despite the benefits of the mixed method and the fact that it can add value to the outcome of the research in terms of richness and greater validity, Molina-Azorín (2010) has claimed that there is a limited amount of mixed method research in the management discipline, because the requirements of journals force authors to write a limited number of pages. This is why most researchers rely on a single method.

The author believes that relying on a single source of data would not be enough to conduct the research study and would not make it possible to meet the objectives of the research. Table 26 and Table 27 show the articles in the business management field that have adopted the mixed method, and Table 28 shows the methods adopted in the studies that have been conducted to assess the readiness for QI.

Table 26 Strategic Management Journal
Source: Molina Azorín and Cameron (2010).

<table>
<thead>
<tr>
<th>Strategic Management Journal</th>
<th>Non-empirical articles</th>
<th>Empirical articles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of non-empirical articles</td>
<td>No. of empirical articles</td>
</tr>
<tr>
<td>2003/2009</td>
<td>53</td>
<td>365</td>
</tr>
</tbody>
</table>
Table 27 Journal of Operations Management
Source: Cameron and Molina-Azorin (2010).

<table>
<thead>
<tr>
<th>Journal of Operations Management</th>
<th>Empirical articles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of empirical articles</td>
</tr>
<tr>
<td>2003/2007</td>
<td>187</td>
</tr>
</tbody>
</table>
Table 28 Methodology adopted for assessing the organisational readiness for quality initiatives.

<table>
<thead>
<tr>
<th>Authors/year</th>
<th>Title</th>
<th>Method adopted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks et al. (1995a)</td>
<td>A physical examination of health care's readiness for a TQM program: A case study</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Weeks et al. (1995b)</td>
<td>Is your organization ready for TQM? An assessment methodology</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Elgamal (1998)</td>
<td>An examination of organization and sub-organization readiness for total quality management</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Radder and Lynette</td>
<td>The readiness of selected South African organisations to mass customise</td>
<td>Quantitative</td>
</tr>
<tr>
<td>(2000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pheng and Chuan</td>
<td>A study of the readiness of precasters for just-in-time construction</td>
<td>Quantitative</td>
</tr>
<tr>
<td>(2001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aksu (2003)</td>
<td>TQM readiness level perceived by the administrators working for the central organization of the Ministry of National Education in Turkey</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Hensley and Dobie</td>
<td>Assessing readiness for Six Sigma in a service setting</td>
<td>Quantitative</td>
</tr>
<tr>
<td>(2005)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lameei (2005)</td>
<td>Assessment of organization readiness for TQM implementation</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Bayazita and Karpak</td>
<td>An analytical network process-based framework for successful TQM: An assessment of Turkish manufacturing industry readiness</td>
<td>Quantitative</td>
</tr>
<tr>
<td>(2007)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Djerdjori and Aleter</td>
<td>TQM readiness assessment in the public sector in the United Arab Emirates</td>
<td>Quantitative</td>
</tr>
<tr>
<td>(2007)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authors</td>
<td>Title</td>
<td>Methodology</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Aria <em>et al.</em> (2009)</td>
<td>Readiness of Iran universities of medical sciences for conducting total quality management (TQM) according to educational managers’ point of view</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Ben Jaber (2010)</td>
<td>Investigating the factors affecting the readiness for TQM implementation within Libyan higher education institutions (doctoral dissertation)</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Poole and Mazur (2010)</td>
<td>Assessing readiness for lean change in emergency department</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Lagrosen <em>et al.</em> (2011)</td>
<td>Organisational learning and Six Sigma deployment readiness evaluation: A case study</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Lee <em>et al.</em> (2011)</td>
<td>Developing a readiness self-assessment model (RSM) for Six Sigma for China enterprises</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Farhadi <em>et al.</em> (2012)</td>
<td>Presenting a model determining readiness level of personnel admission to establishment TQM in Isfahan Behr a spinning and weaving company</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Monsef <em>et al.</em> (2012)</td>
<td>Evaluation of readiness for implementation of TQM at Islamic Azad University</td>
<td>Quantitative</td>
</tr>
</tbody>
</table>
3. Selected method

As has been mentioned earlier, this study is based on a pragmatist position, where the research method is mixed method, which means that it adopts a quantitative deductive approach and an inductive approach by qualitative method.

The mixed method is used in this research as a complement to the findings and to validate the results. Johnson et al. (2007) declared that the results of the mixed method enhance the validity of results and show that the results are not an artifact.

For example, the current practices in K-SMMIs can be measured via a quantitative method, but it would not provide a deep understanding of what is affecting these practices unless a qualitative method is adopted to enrich the knowledge and to provide more room to ask about and explore the factors that might affect performance or delay the use of LS. Vidich and Shapiro (1995, p. 31) stated, “Without the survey data, the observer could only make reasonable guesses about his area of ignorance in the effort to reduce bias.” In addition, having different sources of data will make it possible to identify the reasons, obstacles and enablers within K-SMMIs.

Additionally, via the mixed method the problem can be viewed from different perspectives, which will enhance the meaning and enrich understanding, and in turn complete the whole picture of the situation being explored. Moreover, it will help to validate, compare and triangulate the results from different perspectives (Clark, 2010). Additionally, the mixed method will help in reducing the bias that may come from a single source and increase validity (Yauch and Steudel, 2003; Eisenhardt, 1989).

4.4.5 Fifth-layer time horizon

According to Saunders et al. (2009), the time horizon of a study is highly dependent on the purpose of the study. There are two types of time horizon studies: longitudinal and cross-sectional. If the purpose of the research is to look for something over a period of time, for example the process of manufacturing industries over time, then the researcher would be likely to go for a longitudinal study; if the
The research purpose is to provide a snapshot, then a cross-section is the best. In a cross-sectional study researchers often adopt an employee survey strategy (Robson, 2002).

As the purpose of this study is to have a snapshot of the current practices of K-SMMIs, the researcher opted to use a cross-sectional approach. The move to a cross-sectional study was not randomly chosen by the researcher, but was done because there was no previous information regarding LS in the Kuwaiti context that the researcher could build on to see what had improved over time. According to Bouma and Atkinson (1995, p. 114), in a longitudinal study researchers need to ask “Has there been any change over a period of time?” which is not possible in the present case.

4.4.6 Sixth-layer techniques and procedures

The researcher is trying to answer the research questions by identifying how far current practices are from a LS and what factors are delaying LS implementation within K-SMMIs; in other words, to assess the readiness of K-SMMIs. To do so, it is necessary to identify the best method to help capture the required information. There are different types of data collection techniques that are used in the business and management field, such as questionnaire, structured interview and structured observation (quantitative data collection), while the analysis can be conducted by associated quantitative graphs and statistical analysis to generate numerical data. In the qualitative method data collection is done by semi-structured and unstructured interview and observation and data analysis are by categorising data (Saunders et al., 2009).

In this research the researcher chose closed-ended questionnaire, open-ended semi-structured interview and observation as the main techniques for collecting the required data to enable him to answer the research questions and meet the objectives of the research.

4.5 Sampling techniques

Before conducting data collection, researchers need to consider sampling techniques to enable them to obtain the appropriate data. According to Palys (1997),
research questions and the objectives of the research are the determinants of the sampling frame. Abu-Hussin (2010) stated that after identifying the target population, the researcher must categorise the sample by using a proper technique. As Kumar (1999, p. 148) claimed:

“Sampling is the process of selecting a sample (small or few respondents) from a big group (population) to become the basis for estimating or predicting a fact, situation, or outcome regarding the big group (population).”

There are two different types of sampling technique available to researchers: probability sampling (representative) and non-probability sampling (judgemental). Probability sampling ensures that the whole population has an equal opportunity to be selected, while non-probability sampling is the opposite and is used where there is difficulty in obtaining or including the whole sample, so that not all the population can be represented in the sample (Abu-Hussin, 2010).

Choosing between these two techniques is highly dependent on the availability of the resources and accessibility to the populations; other factors that affect the choice between the two techniques are if the research requires face-to-face contact with participants and if the population is geographically concentrated (Saunders et al., 2009).

There are five different sampling techniques under non-probability sampling: quota, purposive, snowball, self-selection and convenience. There are five sampling techniques under probability sampling: simple random, systematic, stratified random, cluster and multi-stage (Saunders et al., 2009), Table 29 shows the comparison between probability sampling techniques and Table 30 shows the comparison between non-probability sampling techniques.
Table 29: Impact of various factors on choice of probability sampling techniques


<table>
<thead>
<tr>
<th>Sample technique</th>
<th>Sampling frame required</th>
<th>Size of sample needed</th>
<th>Geographical area to which suited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple random</td>
<td>Accurate and easily accessible</td>
<td>Better with over a few hundred</td>
<td>Concentrated if face-to-face contact required, otherwise does not matter</td>
</tr>
<tr>
<td>Systematic</td>
<td>Accurate, easily accessible and not containing periodic patterns; actual list not always needed</td>
<td>Suitable for all sizes</td>
<td>Concentrated if low face-to-face contact required, otherwise does not matter</td>
</tr>
<tr>
<td>Stratified random</td>
<td>Accurate, easily accessible, divisible into relevant strata</td>
<td>Suitable for all sizes</td>
<td>Concentrated if low face-to-face contact required, otherwise does not matter</td>
</tr>
<tr>
<td>Cluster</td>
<td>Accurate, easily accessible, relates to relevant clusters not individual population members</td>
<td>As large as practicable</td>
<td>Dispersed if face-to-face contact required and geographically based cluster used</td>
</tr>
<tr>
<td>Multi-stage</td>
<td>Initial stages: geographical. Final stage: needed only for geographical areas selected, see comments for simple random and systematic</td>
<td>Initial stages: as large as practicable</td>
<td>Dispersed if face-to-face contact required, otherwise no need to use this technique</td>
</tr>
</tbody>
</table>
Table 30 Impact of various factors on choice of non-probability sampling techniques.

<table>
<thead>
<tr>
<th>Sample type</th>
<th>Possibility of sample being representative</th>
<th>When useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quota</td>
<td>The chance of being representative is very high in this type and that depends on the selection of quota variable</td>
<td>Used if there are cost and time constraints</td>
</tr>
<tr>
<td>Purposive</td>
<td>The chance of being representative is low and is dependent on the research decision of choosing the sample:</td>
<td>When the researcher is working with small samples</td>
</tr>
<tr>
<td></td>
<td>Extreme cases</td>
<td>When the researcher is focusing on unusual or special cases</td>
</tr>
<tr>
<td></td>
<td>Heterogeneous</td>
<td>When the researcher is focusing on key themes</td>
</tr>
<tr>
<td></td>
<td>Homogeneous</td>
<td>When the researcher is focusing on in-depth cases</td>
</tr>
<tr>
<td></td>
<td>Critical cases</td>
<td>When the researcher is focusing on important cases</td>
</tr>
<tr>
<td></td>
<td>Typical cases</td>
<td>When the researcher is focusing on illustrative cases</td>
</tr>
<tr>
<td>Snowball</td>
<td>The chance of being representative is low but the case will have the characteristics desired</td>
<td>When there is difficulty in identifying cases</td>
</tr>
<tr>
<td>Self-selection</td>
<td>The chance of being representative is low</td>
<td>Where exploratory research is needed</td>
</tr>
<tr>
<td>Convenience</td>
<td>The chance of being representative is very low</td>
<td>When there is very little variation in the population</td>
</tr>
</tbody>
</table>
Based on the above explanations and differentiation between techniques, this research has adopted non-probability sampling by using snowball and purposive techniques. The two sections below explain why this study relied on these two sampling techniques.

4.5.1 Snowball sampling

The researcher faced difficulty in contacting and inviting participants to his study. At the early stage of the research, the researcher looked in the Kuwaiti governmental database to make a list of target industries that he wanted to approach. A number of manufacturing industries were listed to make an initial contact via email to gain permission from the selected industries. The researcher explained the nature and motive of the study by giving a short explanation of LS and the brief of the survey. 30 emails were sent to the firms that were found in the Kuwaiti industrial guide list; surprisingly, no responses were received. Some of the email addresses were found to be wrong and some information within the industrial guide was found to be inaccurate and out of date.

The researcher then flew to Kuwait and went to the industrial authorities to seek help in finding participants, as the researcher had never worked within the industrial field. Unfortunately, he only received an industrial guidebook that contains all listed industries until 2009, which represents the sample framework for the researcher.

As a final step, the researcher took the sample framework that included all the registered industries (small and medium only) and the snowball technique was used by relying on personal contacts that were able to lead to the identification of more participants (within the sample framework), which worked well for some time, until the researcher reached the level where he could not increase the number of participants; in other words, the referral cycle ended. So he decided to follow a more pragmatic approach, a “knocking door” approach, by going directly to the firms, which worked well for increasing the number of participants to 50 firms.

The snowball approach was used for the expert-panel interview as well, as the researcher went to the first few participants and asked them to provide him with
potential respondents that they might know. Venter et al. (2005, p. 291) followed the snowball sampling technique when they struggled to find respondents to participate in their research. They stated: “Following up on referral proved to be the most effective approach and eventually yielded the majority of the potential respondents listed on the sampling frame.” In this approach the research would not have an accessible sampling frame for the population. One of the problems with this technique is that it might be not very representative of the whole population. However, while such a sampling approach could work perfectly well with qualitative data, as it is normally not generalizable, that does not mean that the snowball approach cannot be applied for a quantitative methodology (Bryman and Bell, 2011).

According to Saunders et al. (2009), a snowball sampling technique, as already discussed, is commonly used when the researcher has difficulty in capturing the desired population, but the problem with this technique is that it could lead to huge bias, as participants are most likely to refer the researcher to other potential participants who are or may be similar to their situation, which may result in a homogenous sample. Having said that, the researcher did not have a better technique to use due to the lack of support from governmental industrial institutions in identifying potential participants; and due to the fact that the researcher was under time constraints which required him to establish his work then write it up. In order to mitigate the bias that might occur from the snowball technique, during the project the researcher realized that he could visit companies without a referral from other people, which worked well. This technique was followed particularly in the survey and the interviews with the expert panel.

Sarantakos (1998) believes that researchers predominantly use the snowball technique for the following reasons:

- When there is a lack of sampling frame which makes it impossible for the researcher to achieve a probability sample;
- When the target population is unknown; and/or
- When it is difficult to approach the respondents in any other way.
4.5.2 Purposive sampling

Although this research used the snowball technique to get more participants, the researcher followed purposive techniques in addition to the snowball in an attempt to have 50 per cent of participants as ISO 9000-certified firms. Purposive sampling allows the researcher to choose cases that will best answer the research questions and enables the researcher to meet the objectives of the research (Saunders et al. 2009). In purposive sampling, the researcher is making an effort to find the most appropriate sample for his/her research and the one that will best help in achieving the objectives of the research, thus the samples used in this technique could be representative of the population (Parasuraman et al., 2004). Kumar (2010, p. 207) added: “this type of sampling [purposive] is extremely useful when you want to construct a historical reality, describe a phenomenon or develop something about which only a little is known”.

Neuman (1997) stated that there are certain occasions when purposive sampling is helpful for researchers, which include when the researchers are using it to:

1. Select unique cases that are especially informative;
2. Select members of a difficult-to-reach, specialised population; or
3. Identify particular types of cases for in-depth investigation.

Although some authors declare that a non-probability sample could be biased and in most cases cannot be generalised, the author believes that for this particular study the outcome can still be generalised and can be representative, as it has been derived from a population that is from within the registered industries in Kuwait. Even though he used the snowball technique, that was only for gaining more contacts (the author does not think that this will affect the sample) and purposive techniques were employed to make sure that the selected sample fitted the research criteria, which is that the industries had to be small and medium and half of them must be ISO 9000-certified firms.

Using snowball and purposive sample techniques, which are types of non-probability sampling, helped in identifying respondents and specifying the available population (K-SMMIs). These two sampling techniques seemed to be appropriate,
bearing in mind the descriptive and exploratory nature of this study, and to satisfy the needs of the research, as the snowball technique provided more participants and the purposive technique gave the researcher the opportunity to make his own judgement when selecting the samples.

Kumar (2010, p. 206) stated: “Non-probability sampling designs are used when the number of elements in a population is either unknown or cannot be individually identified… [and is] commonly used in qualitative and quantitative research.”

4.6 Data collection and analysis

In this study several sources of data (primary and secondary) were used to collect the required information. A survey of K-SMMIs, a case study of K-SMMIs, and expert-panel interviews (governmental institutions, academics and consultants) were used for the primary data. The techniques included questionnaire, semi-structured interview, observation (structured and unstructured) as well as a literature review (secondary data). With regard to the credibility and validity of the research, several tactics were employed, such as triangulation, pilot testing and the solicitation of expert opinions on the final outcome to ensure that the data that would be as credible and valid as possible. The sections below explain how the data were collected and analysed.

4.6.1 Interview

What is most important is that researchers need to avoid bias when conducting an interview by having clearly phrased questions so that respondents can properly understand the questions. Moreover, the researcher needs to use a natural tone to avoid influencing the respondents’ answers (Saunders et al. 2009). The advantage of the interview technique is that the researcher can obtain a deeper understanding of the phenomena that he/she is investigating, as open-ended questions allow respondents to talk more about the topic, which the researcher can benefit from. Easterby-Smith et al. (2004) argued that open-ended questions can eliminate bias. Moreover, Saunders et al. (2009) added that the questions should be short and jargon and complexity free, and that the researcher should avoid questions
that contain theoretical concepts. According to Axinn and Pearce (2006), an interview can offer an opportunity for respondents to shed light on other factors that have not been mentioned in the survey.

Patton (1990, p. 278) commented: “The purpose of interviewing is to find out what is in and on someone else’s mind… We interview people to find out from them those things we cannot directly observe” and highlighted the significance of interviews as follows:

“We interview people to find out from them those things we cannot directly observe. The fact is that we cannot observe everything. We cannot observe feelings, thoughts and intentions. We cannot observe behaviour that took place at some previous point in time. We cannot observe situations that preclude the presence of the observer. We cannot observe how people have organised the world and the meaning they attach to what goes on in the world. We have to ask people questions about those things. The purpose of the interview then is to allow us to enter into another person’s perspective.” (Patton, 2002, pp. 340-341).

This technique has been adopted to help in answering the research questions (RQ1, RQ2, RQ3, RQ4, RQ5 and RQ6).

4.6.1.1 Type of interview

There are three types of interview that can be deployed in research: structured interview, semi-structured interview and unstructured interview (Saunders et al., 2009). The structured interview is referred to as a quantitative technique, as the researcher tends to ask structured, standardised questions to collect quantifiable data. While semi-structured and unstructured interviews are part of qualitative methodology, the researcher in those types is using non-standard questions to get as much information as possible.

The differences between these types are that in the semi-structured interview the researcher should prepare key questions that would lead him/her to answer the research question or the aspect he/she wants to investigate, while in the unstructured interview the researcher does not need to have a list of questions, but merely requires
a clear idea of the subject and what he/she is trying to achieve. This kind of question would provide the research with in-depth information about the investigated area.

In order to get the desired information, the researcher decided to adopt a semi-structured interview, as it seemed to be the most appropriate method to give the researcher deep knowledge about the investigated area. Moreover, it would open new areas that the researcher may have not considered when listing the questions. After reviewing the available literature, the researcher prepared a list of questions that are related to lean principles, lean CSFs that are required to start and sustain LS and other issues related to Kuwaiti manufacturing industries.

However, the researcher did not restrict himself only to the area that was investigated in the first phase (questionnaire), in which the researcher was trying to understand the current situation based on six factors – processes; planning and control; human resources; top management and leadership; customer relations; and supplier relations – as those six factors would not reveal the factors that are delaying a LS implementation. Thus, the interview would provide more details about the situation. After preparing the questions, they were sent to the researcher’s supervisor and experts in the field in Kuwait to gain their feedbacks. The feedbacks from both parties were incorporated and eventually the questions were modified according to their suggestions.

A face-to-face semi-structured interview was adopted to enable the researcher to reveal the reasons, obstacles and enablers that represent the potential barriers or the potential enablers for driving a LS implementation in K-SMMIs. As this is the first research study that has tried to explore K-SMMIs’ current practices and measure them against LS, this technique was chosen to enable the researcher to understand the situation in depth.

4.6.1.2 Interview data collection

According to Saunders *et al.* (2009), researchers must interview participants who have decent knowledge of the subject area, who are interested in the research and who can articulate their views precisely. In this research study the researcher was trying to conduct interviews with people who fitted Saunders *et al.*’s (2009)
criteria in order to avoid wasting time and gaining misleading and inaccurate answers. It is essential for researchers to conduct interviews at all levels (Saunders et al., 2009); however, in this research it was not possible to maximise the number of participants due to language barriers and a lack of knowledge at the lower level.

In this study interviews were conducted with three different groups. The first group consisted of managers (such as plant, quality, production and HR managers) from the 50 K-SMMIs that were surveyed in the first stage (lasting between 30 and 45 minutes). The target respondents here were managers who are involved in decision making and have a good knowledge of the strategy of the firm and a desire to participate in the interview.

Among the 50 participants in the survey, 27 managers agreed to participate in an interview, although other managers refused for different reasons, such as lack of time and desire. The aim behind choosing a representative from each firm involved in the questionnaire was to enhance the validity of the results and to understand their situation and try to make sense of it, since by collecting data from different companies the researcher can strengthen the internal consistency of the research (Yin, 2003). Furthermore, some aspects cannot be measured (or it will not be possible to obtain an accurate answer) by a questionnaire, such as the level of knowledge and awareness of lean and quality systems; better results can be gained from face-to-face interviews.

The second group were in the two case study firms where the researcher had the chance to conduct an interview at different levels in the firm (lasting between 15 and 90 minutes). Although there was a difficulty due to a language barrier, the author managed to overcome this problem by inviting the supervisor of this research to attend the interviews, as he can speak different languages (Urdu, Hindi and Nepali), which made it possible to cover the whole level of the first case study; in the second case study the author was escorted by the production manager, who is Indian and acted as an interpreter.

Finally, the third group of interviewees was the expert panel, which included a quality management practitioner, academic staff from Kuwait University who are teaching lean subject and quality management subjects and have publications related to quality management within the Kuwaiti context, ISO and quality management
consultants, and finally people from the governmental institutions who are directly involved in Kuwaiti industry and are aware of the relevant policies (lasting between 1 and 3 hours).

To ensure that the most honest answers were obtained, the researcher assured the participants that neither their name nor their company’s name would be mentioned in the research. The researcher started by explaining the motives behind conducting this kind of research and how this could help Kuwaiti industries, and in addition they were assured that the prime objective of the study was not to know how each firm was performing, but rather to have a deep understanding of the reasons behind their current practices and how they could benefit from implementing a LS.

4.6.1.3 Interview analysis

A researcher has to choose the right method for analysing the data collected (Sadeghian, 2010; Eisenhardt, 1989). Proper analysis of the data collected will allow the researcher to identify any gaps and cover them by collecting other data from different resources. The data analysis process is to find “patterns, coherent themes, meaningful categories, and new ideas and in general uncovers better understanding of a phenomenon or process” (Suter, 2006, p. 327).

Prior to conducting the interviews, the researcher asked permission to record the discussion (Malhotra and Peterson, 2001); the researcher was eager to record all the interviews to ensure that he did not miss any important aspects or information. However, not all of the participants agreed to be recorded, so the researcher had to rely on writing notes and comments. After the interviews finished, the researcher started to summarise the important aspects in the interview without listening to the recordings and to plot the findings in categories. After that, he listened to the recorded interviews and updated the list.

The researcher offered participants a copy of the transcript to ensure that their answers were not incorrectly interpreted. Most of the participants decided not to review the transcript; only two participants asked for a summary of the interview.
They were provided with a summary of the findings that would be included in the study and eventually they agreed with the content.

The method of interview analysis was based on coding and clustering the findings from the interviews (Sadeghian, 2010; Glaser and Strauss, 1999; Strauss and Corbin, 1998). The researcher went through the transcript and notes and started eliminating unnecessary words and phrases that did not answer the questions; what was left was categorised and labelled with codes into a number of clusters.

Bryman and Bell (2011, p. 485) commented:

“Some interviews or at least large portions of them are sometimes not very useful, perhaps because interviewees are reticent or their answers are not as relevant to your research topic as you had hoped… for many of your interviews, it would be better to listen to them closely first, at least once or more usually twice, and then transcribe only portions that you think are useful or relevant.”

So the concentration was on the aspects that had direct relevance to the research questions and questions asked in the interview. For example, the researcher asked about the reasons behind adopting ISO 9000; the answers to this question were different depending on the interviewee’s perspective and the vision of the company, but most answers were to maximise sales or improve quality, so the researcher coded them “sales”, “quality” etc.

After completion of the interview, the outcome of the discussion was a transcript and the data obtained were labelled with codes. The open answers were analysed by a content analysis approach. Content analysis is “a thorough research technique which allows replicable and valid inferences from data to their context” (Krippendorff, 1980, p. 21); according to Bryman and Bell (2007, p. 304), content analysis is “an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and in a systematic and replicable manner”.

In using content analysis the researcher followed steps similar to those offered by Psychogios and Priporas (2007):
1. The researcher has listened to the available recorded discussion and compared it with handwritten notes;
2. Defining units for general meaning and for aspects that are relevant to LS;
3. Grouping units according to the aspects related to LS; and finally
4. Formatting them from the groups of meaning and identifying them from the interviews.

Using this analysis helped the researcher to develop a clear picture of the factors that are affecting the readiness level for a lean system.

4.6.2 Questionnaire

Neelankavil (2007, p. 160) claimed: “A questionnaire is defined as a series of questions on specific topic, based on specific information needs of research goals that respondents answer.” According to Saunders et al. (2009), questionnaire techniques tend to be used for descriptive or explanatory research studies.

In descriptive research, the questionnaire helps in knowing attitudes, opinions or organisational practices (Saunders et al., 2009). There are different types of questionnaire, such as self-administered questionnaire, structured interview and telephone questionnaire. In business and management studies, if the purpose of the research is to be descriptive, the researcher needs to administer the questionnaire to the sample that could be representative of the population (Saunders et al., 2009).

Bell’s view (1999, p. 245) is that “the questionnaire is a widely used and useful instrument for collecting survey information providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyse”. This technique has been adopted to help in answering the research question (RQ1).

In this study, the questionnaire was distributed to 200 randomly selected K-SMMIs; valid responses were received from 50 firms, which resulted in a response rate of 25 per cent. A total of 25 firms were ISO 9000 accredited. The total mean score for firms who are successfully practising LS activities was assumed to be \( M \geq 4 \) for each of the constructs.
To validate this assumption, the survey was sent to 15 successful lean manufacturing companies (all of which are large in size) in different regions (three from Kuwait, seven from Saudi Arabia, two from the UAE, two from Nigeria and one from the UK) to use as a proxy. It would have been more accurate to test the survey on successful lean K-SMMIs, or SMMIs from the nearby region, but this was not possible due to a lack K-SMMIs who are practising LS, and limitations on time. However, the quality and management practices used in his study are derived from different studies around the world, and it is believed that most of the elements in the questionnaire are important to LS regardless of the firms’ size and region.

The criterion used to select the 15 firms was that they were successfully using LS. In other words, they had to be satisfied with the results they had achieved after LS implementation; this was verified via contacting the firms’ managers by phone and email. The total mean score for the 15 firms was M≥4 for each construct, which shows that lean firms regard these practises as important for LS, supporting its use as a benchmark; this meant that firms who scored M≥4 in the main study could be considered ready to implement LS. It should be noted that the 15 firms were used purely to validate the assumption that a lean company would score M≥4, and were not used for comparison purposes.

The surveys used five-item Likert scales to identify the extent to which the company had adopted quality and management practices, and to set up valid and reliable numeric results for statistical analysis. Five-Likert scales were chosen to give the participants the freedom to choose the appropriate rating for their current situation. For the first two constructs (processes, and planning and control), the scale was as follows: never (1), very rarely (2), sometimes (3), frequently (4) and always (5); for the remaining constructs the scale was: strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5).

The responses were entered into SPSS software to generate different analyses, including Cronbach’s alpha, descriptive analysis, Crosstab analysis, independent sample t-test and one-way ANOVA test.

- Cronbach’s alpha is used to check reliability and internal consistency. This test is very important and the researcher needs to make sure that there is internal consistency to carry on doing further analysis; a value above 0.7 is considered to be acceptable (Pallant, 2010).
• Descriptive analysis is recommended to be used before conducting further statistical analyses such as t-test, ANOVA, or correlation, as it helps to confirm that the researcher has not violated the assumption. In this study it was used to gain information in order to describe the sample (Pallant, 2010). It is also used to organise and summarise the data that have been gathered; this test helps to organise respondents’ answers into statistical data to see the frequency of answers (Coakes, 2005).

• Crosstab analysis was carried out with different variables to understand the responses between two variables.

• An independent sample t-test was used to compare the mean scores for two different groups to see if there was a significant difference between groups such as ISO 9000-accredited firms and non-ISO 9000-accredited firms, between firms of different sizes, such as small and medium-sized firms, and ownership structure i.e. family and non-family owned firms. This test allowed knowledge of whether the two groups show statistically significant differences in mean score, which made it possible to test the hypothesis (Pallant, 2010).

• A one-way ANOVA test was used to identify whether there is a statistically significant difference in mean score between more than two groups (i.e. in the present case, testing the effect of different sectors). The ANOVA test is a mean analysis of variance, which means comparing the variability in scores for different groups to test the hypothesis to see whether the sector has an effect on current practices and readiness for LS (Pallant, 2010). This test was used to see whether the different sectors and management style demonstrated statistically significant differences in mean score.

4.6.3 Observation

Observation comes in two forms: quantitative (structured observation) and qualitative (participant observation), according to Saunders et al. (2009). Hussey and Hussey (1997, p. 159) defined observation as “a method for collecting data associated with either positivist [quantitative] or a phenomenological [qualitative]” and claimed that there are two types of observation: participant observation and non-participant observation. In non-participant observation the role of the researcher is to
observe and record people’s actions and behaviours without being involved; while participant observation is the opposite and the researcher is involved in the subject or phenomenon being researched.

In this study, non-participant structured observation (direct observation) was adopted to allow validation of the findings. By adopting the observation technique, the researcher would have the opportunity to see for himself the working area within industries and be able to notice if there is a visual management guide in place (health and safety, designated area, inventory etc.), which would help him to make sense of how K-SMMIs are running their businesses and eventually what sort of potential barriers are in place. For example, if the researcher noticed that there were no signs and labels for items and equipment, that would be likely to contribute to delaying the process and cause wasted time; as another example, if equipment was not clean but was full of dirt, this would mean that firms were not following any preventive maintenance, and so on.

Observation is “a systematic process of recording behavioral patterns of people, objects, and occurrences as they happen. No questioning or communicating with people is needed” (Zikmund et al., 2012, p. 239). Zikmund et al. (2012, p. 239) declared that the observation technique is useful when it meets the conditions below:

1. The observation serves a formulated research purpose;
2. The observation is planned systematically;
3. The observation is recorded systematically and related to general propositions, rather than simply reflecting a set of interesting curiosities; and
4. The observation is subjected to checks or controls on validity and reliability.

In the present case, observation was used primarily for two reasons: to serve the research purpose and to check the reliability and validity of the findings. This technique helped in answering the research questions (RQ1, RQ2, RQ3, RQ4, RQ5 and RQ6). The main advantage of observation is that it allows the researcher to obtain an accurate result, as the data is obtained by the researcher directly, unlike other techniques that depend on memory, such as interview, and avoids the respondent bias which can come from a questionnaire (Zikmund et al., 2012). Moreover, observation can provide accurate information for the research. For example, the present study used a survey questionnaire, in which one of the
questions asked was: “Do you use visual management in place?” In a questionnaire, the respondents can easily answer in the affirmative, but in observation the researcher would be able to judge this for himself, which would add more credibility and validity to the outcome.

Zikmund et al. (2012, p. 242) noted: “Many types of data can be obtained more accurately through direct observation than by questioning.” In this study the research used direct observation by collecting data without asking questions.

4.6.4 Concluding remarks for data collection

At certain points the researcher needed to stop the data collection process bearing in mind three factors: the time needed to analyse the data, time for writing up and the saturation which happens when no new insights can be obtained. According to Glaser and Strauss (1999), research reaches the point of theoretical saturation when no new information can be obtained. After a certain amount of time and after interviewing 27 managers and the expert panel, as well as conducting the case studies and the questionnaire, the researcher felt that the information, reasons and obstacles were repeating themselves, and that he had reached the point where he understood the causes of the problem, so he decided to stop collecting data and move forward to the analysis phase. Figure 4 summarises the whole research process that was followed in this research.
4.7 Reliability

Reliability is “the extent to which your data collection techniques or analysing procedures will yield consistent findings” (Saunders et al., 2009, p. 156), so reliable and consistent results should be obtained if the research is applied in different time periods. In order to assess the reliability of the research, the researcher must ask himself/herself three questions (Easterby-Smith et al., 2008, p. 109):

1. Will the measures yield the same results on other occasions?
2. Will similar observations be reached by other observers?
3. Is there transparency in how sense was made of the raw data?

Robson (2002) pointed out factors that may influence the reliability of research, such as participant error or bias and observer error or bias. In order to check the reliability of research, researchers can adopt the most used method to check internal reliability, which is Cronbach’s alpha, as mentioned by Saunders et al. (2009). In addition, pilot testing could enhance reliability (Abu-Hussin, 2010).

In this research study, Cronbach’s alpha was used to evaluate the overall reliability of the measurement scale of each construct, and to examine the reliability of the findings and ensure that the instrument used in the research was reliable.
Cronbach’s alpha provides an approximation of the proportions of the total variance, which represents the reliability of the scale (Oppenheim, 1992). Where the alpha value is computed from 1-0 value, a figure above 0.7 is considered reliable and sufficient (Schutte et al., 2000). Moreover, in order to enhance the reliability, the researcher conducted a pilot study to avoid misinterpretation by respondents (Abu-Hussin, 2010).

Maylor and Blackmon (2005) have said that the quantitative method has a better chance to gain reliability compared with the qualitative method; in the qualitative method researchers are unlikely to follow same procedure in conducting the study. Yin (2003, p. 33) recommended some steps that the researcher should follow to enhance the reliability of research: by using case study protocol and by developing a case study database. In this research the research made sure to use the case study protocol.

4.8 Validity

Saunders et al. (2009, p. 57) claimed that “validity is concerned with whether the findings are really about what they appear to be”. Thus, validity shows that the findings of the research represent what is happening in the situation being studied. According to Ben Jaber (2010), validity has received more attention than reliability in qualitative research. Flick (2007) showed that three types of error could be committed by a researcher which can lead to low validity:

1. The researcher sees a relation, a principle and so on where this is not correct;
2. The researcher rejects relationships where they are indeed correct; and
3. The researcher may ask the wrong question.

There are three different types of validity in empirical research: content validity, criterion validity and construct validity (Srivastava, 2010).

1. Content validity is an important step in assessing a construct (Garver and Mentzer, 1999), as it ensures that there is enough coverage of the issue under study (Srivastava, 2010). Sekaran and Bougie (2010) declared that the validity of the content could be reached by having more of the scale items representing the domain. Sadeghian (2010) said that in order to get content
validity, the researcher needs to review intensively the available literatures to be able to set scale items that can represent the whole domain.

In this research, the researcher made sure that he covered the maximum amount of literature to ensure validity; moreover, the researcher conducted a pilot test prior to the actual conduct of the study. Most of the items in the qualitative method and in the quantitative method were developed based on other researchers’ work and recommendations.

2. There are two types of criterion validity: predictive validity and concurrent validity. Predictive validity indicates the success of the measuring instrument, while concurrent validity is an indication of the present status (Srivastava, 2010).

3. Construct validity “is one of the most significant researchers in development of measurement theory and practice. It links psychometric notions and practices to theoretical notions” (Srivastava, 2010, p. 5.10). Yin (2003, p. 33) has recommended some tactics to be considered by researchers to ensure construct validity, such as using multiple data resources, establishing a chain of evidence and having key informants review a draft case study report.

The researcher in this study believes that the instruments used have content validity, as it was based on reviewing an extensive literature, and the questionnaire and interview questions were piloted. Moreover, the researcher followed the recommendation by Yin (2003) that there should not be a reliance on a single source of data. In addition, the researcher offered respondents the opportunity to review the outcome of the interview, as well as summarising the overall findings of the study and sending that to an expert panel to see whether the results found match the reality of K-SMMIs.

Additionally, for each data collection process pre-testing procedures were conducted, as recommended by Sekaran and Bougie (2010), by piloting the survey and interview questions. Furthermore, triangulation was adopted more than once at each stage during this research to ensure its validity (Creswell et al., 2011). The sections below show the validity procedures (triangulation, pilot test and expert panel) followed in this study.
4.8.1 Triangulation

The triangulation method is inspired by and has its roots in military and navigation strategy, which uses several reference points to locate the exact position of an object (Smith, 1975). Jick (1979) declared that triangulation would improve researchers’ findings and interoperation in the organisational field by collecting multiple viewpoints to enhance the accuracy of results.

Triangulation is a combination of different methods/techniques used to study the same phenomenon (Denzin, 1970). According to Saunders et al. (2009, p. 146), triangulation “refers to the use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you”. As Hussein (2009, p. 3) states, triangulation “is defined as the use of multiple methods mainly qualitative and quantitative methods in studying the same phenomenon for the purpose of increasing study credibility. This implies that triangulation is the combination of two or more methodological approaches, theoretical perspectives, data sources, investigators and analysis methods to study the same phenomenon.”

Thus, triangulation was deployed in this research by combining different data collection techniques, such as questionnaire, observation and interviews, as well as collecting data from different sources, such as from key personnel within K-SMIMs, and from experts, including people from governmental institutions, university members and consultants. This step was used to ensure that the study obtained the most rigorous data possible.

The reason for adopting triangulation was that the researcher’s attention was focused on ensuring the validity (Biggs, 2009) of the data gathered, as well as the fact that there was not enough information with regard to LS on which the researcher could rely. Moreover, this method made it possible to overcome any weaknesses that might have arisen by relying on one approach; as Jack and Raturi (2006, p. 345) explained: “Complementary methods are deployed under the assumption that weaknesses inherent in one approach will be counterbalanced via strengths in another”. Thus, the adoption of triangulation helped to increase the credibility of the research outcomes. As Hussein (2009, p. 10) explained, “triangulation can indeed increase credibility of scientific knowledge by improving both internal consistency.
and generalizability through combining both quantitative and qualitative methods in the same study”.

Within this study, triangulation was achieved by carrying out: a survey (questionnaire and structured observation) as the first stage of the research; semi-structured interviews with firms’ managers as the second step; a case study (semi-structured interview and observation) as the third step; and finally semi-structured interviews with key personnel in governmental institutions, academics at Kuwait University and consultant companies as the fourth step.

In this study, triangulation was used to study the same phenomenon, which is the readiness of K-SMMIs towards LS and the factors that are affecting or delaying their use of LS, by collecting data from various sources (see Figure 5). According to Denzin (1970), triangulation can be used between methods (qualitative and quantitative), or within one method (by using multiple techniques). Triangulation can be used not only to measure the same phenomenon, but can also to enrich understanding and enforce findings, whereas relying on a single method may lead to an important aspect being neglected (Jick, 1979). As Eisenhardt (1989, p. 538) commented: “Triangulation made possible by multiple data collection methods provides stronger substantiation of the constructs and hypotheses”. Furthermore, triangulation enhanced the study’s credibility (Jick, 1979).
4.8.2 Pilot study

A pilot study is a "small scale version[s], or trial run[s], done in preparation for the major study" (Polit et al., 2001, p. 467). It can be used as a pre-test for an instrument such as a survey questionnaire to ensure the clarity of the questions (Baker, 1994). Van Teijlingen and Hundley (2001) said that the pilot study can be used as a feasibility study; they pointed out the advantages of the pilot study and how it can help researchers to avoid failure in research. They stated: “One of the advantages of conducting a pilot study is that it might give advance warning about where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated.”
Moreover, van Teijlingen and Hundley (2001) advised researchers to adopt a pilot study prior to conducting their main research in order to:

- Develop and test the adequacy of research instruments;
- Assess the feasibility of the survey;
- Design a research protocol;
- Assess whether the research protocol is realistic and workable;
- Establish whether the sampling frame and technique are effective;
- Assess the likely success of proposed recruitment approaches;
- Identify logistical problems which might occur using the proposed methods;
- Estimate variability in outcomes to help in determining sample size;
- Collect preliminary data;
- Determine what resources (finance, staff) are needed for a planned study;
- Assess the proposed data analysis techniques to uncover potential problems;
- Develop a research question and research plan;
- Train a researcher in as many elements of the research process as possible.

This research study used a pilot test to enable the researcher to have questions that were as reliable and robust as possible in order to lead to valid and reliable results. As this study adopted the mixed method, there were two forms of pilot test: the first for the questionnaire and the second for the interview questions. According to van Teijlingen and Hundley (2001), a pilot study can be conducted for both qualitative and quantitative methods.

4.8.2.1 Questionnaire pilot test

For the questionnaire, the survey was sent to academic members of Kuwait University and 15 firms who were similar to the target population. The pilot study in this research followed the guidelines proposed by Peat et al. (2002, p. 123), as cited in van Teijlingen and Hundley (2001):

- Administer the questionnaire to the pilot participants in exactly the same manner as it will be administered in the main study.
- Obtain feedback from the participants to help in identifying any ambiguities and difficult questions.
- Make sure that the time needed to complete the questionnaire is reasonable.
- Abandon all unnecessary, difficult or ambiguous questions.
- Assess whether each question gives an adequate range of responses.
- Establish that replies can be interpreted in terms of the information that is required.
- Make sure that all questions are answered.
- Rephrase and modify questions that are not answered properly.
- Incorporate the comments provided by the participants in the pilot study and if needed shorten, revise and, if possible, pilot again.

Response and feedback were critical in the research directions. The feedback and suggestions were as follows:

1. The questions included jargon and complex words which showed ambiguities; non-lean firms would not be able to understand them, so those types of questions should be asked of companies that are practising a lean system; and
2. There were far too many questions, which might lead to a decrease in the response rate or less credibility in the answers.

The researcher agreed with the suggestions from the pilot test and thought them very valid comments. In the first draft of the questionnaire, the researcher used direct questions regarding lean tools and techniques. For example, the researcher asked: have you implemented 5s; are you practising kaizen continuous improvement; have you implemented SMED etc. As a result of the feedback, the researcher decided to ask indirect questions that would help him to meet the objective of the research. The second draft was developed and modified and sent to a similar group, and their feedback was incorporated, some of the questions being further reworded and modified.
4.8.2.2 Interview pilot test

After preparing the interview questions, they were sent to the researcher’s supervisor and experts in the field from Kuwait to gain their feedback. That feedback was incorporated and eventually the questions were modified according to these suggestions.

4.8.3 Expert opinion

According to Oxford Dictionaries (2014), the definition of an expert is “a person who is very knowledgeable about or skilful in a particular area”, or a person “having or involving a great deal of knowledge or skill in a particular area”.

The reason behind using an expert panel’s opinion and knowledge is to add trustworthiness about the findings of the research, which will enhance the robustness of the outcome as well as guiding the researcher’s perspective (Achanga, 2007). The experts should be knowledgeable in the subject matter being addressed and discussed in the research (Fink, 1998).

The researcher targeted experts who are involved in the subject area and aware of Kuwaiti manufacturing sectors (consultants), those who have published studies regarding Kuwaiti manufacturing sectors and QI (academics from Kuwait University), and key personnel from Kuwaiti governmental institutions who are policy makers and policy implementers, since Achanga (2007) argued that experts have to have be knowledgeable (have studied or worked) and up to date in the area under study.

4.8.4 Bias avoidance tactics

Biggs (2009) demonstrated that there are threats to the validity of research which can came in different forms, such as researchers altering what has been observed in reality; researcher bias, as the researcher’s presumptions and preconceptions can affect his/her understanding; and respondent bias, as the respondent may alter their behaviour or statements, which may lead to misleading conclusions.
Several tactics can be adopted in research to enhance its validity and mitigate the risk of bias, such as:

- Prolonged involvement: researchers should spend a long time in the investigated field to reach a better understanding and accurate conclusion;
- Triangulation: having different sources of data in terms of respondents, theories, methods etc. so that the research can obtain more accurate results which will enhance the validity and eliminate the bias;
- Peer debriefing/support: discussing the work with fellow researchers; and
- Audit trail: showing other researchers or experts in the field the outcomes of the research.

In this research two tactics were adopted: triangulation and an audit trail. Prolonged involvement could not be adopted, as the researcher is based in the UK and the target respondents for this research are in Kuwait. Peer debriefing tactics could also not be adopted, as there were no fellow researchers in the same department and due to the fact that the researcher is undertaking a PhD, so there are time constraints. The researcher felt that triangulation and audit trail tactics could provide a good, valid and bias-free outcome, as with triangulation he would be able to mitigate respondent bias and an audit trail would enable him to moderate researcher bias, as it would be approved by an expert in the field.

4.9 Response rate

The response rate is the number of valid questionnaires as a percentage of the total number of questionnaires sent; in other words, it is the number of actual questionnaires divided by usable questionnaires (Fink, 1995). According to Baruch (1999), there is no agreement among scholars about what is the right percentage for the response rate and what is considered to be acceptable or not. A lower response rate could affect the research’s reliability (Bowling, 2005).

The reason that people do not respond is simply explained by Baruch (1999) as either the respondent’s unwillingness to participate or that he or she has not received the questionnaire. The researcher cannot do much about the former reason, although this research tried to convince respondents by explaining the importance of
their participation. Bowling (2005) added other factors that decrease the response rate, such as the researcher’s inability to contact respondents and communication barriers.

So the researcher needs to be aware of certain factors before conducting the questionnaire. In order to increase the response rate, the researcher can plan his or her visit for an appropriate time and avoid holidays (Akl et al., 2001). Furthermore, researchers can avoid a low response rate by having good planning prior to conducting the questionnaire, which can easily overcome a low response rate by choosing the most suitable time (Akl et al., 2001).

There are several ways to employ a questionnaire, such as postal mail, electronic mail, online surveys, phone interviews (Akl et al., 2011) and distributing in person. Mail surveys show a low response rate (Baruch, 1999). Bowling (2005) has alleged that a face-to-face interview allows the researcher to have a higher response rate: “A friendly interviewer on the doorstep can be motivating, and it may be easier to convince respondents of the legitimacy of the study in person, which should increase response rates” (Bowling, 2005, p. 285). A study conducted by Sykes and Collins (1988, cited in Bowling, 2005) showed that response rate via face-to-face interview is higher than the telephone method.

Ranchhod and Zhou (2001) explained why email and telephone surveys have a low response rate, and said that it could be due to many reasons, such as:

- Lack of anonymity;
- Lack of formal image;
- Lack of incentive; and
- Lack of cosmetic features.

The response rate in this study was 25 per cent. The questionnaire was sent to 200 respondents and the number of usable returned questionnaires was 50. The low response could be attributed to different reasons:

1. Some of the firms said that they were not interested.
2. Some firms said that top management does not allow them to participate due to confidentiality, as they have had bad experiences in the past with a number of students.

3. It was not possible to reach a large number of firms, as their details were drawn from the industrial guide provided by the Kuwait Public Authority of Industries (KPAI) and phone numbers and email addresses were invalid.

4. Other firms said that they were very busy as the time chosen (December-February) was their peak season.

In the pilot test, the researcher noticed that sending the questionnaire via email failed, as no responses were received due to the invalidity of the email addresses and other reasons, possibly including a lack of interest from the respondent or the lack of informality of the approach. However, to overcome this problem the questionnaire was distributed in person, as explained in the snowball sampling section. The author followed certain tactics to increase the response rate, including:

1. Attaching a letter from the University of Portsmouth (written by the supervisor of this research) that contained the formal university logo;
2. Explaining the motives of the study, both on the phone and in the attached letter;
3. Assuring the respondent anonymity and confidentiality;
4. Offering the respondents a copy of the identified results, which might help them to improve their processed;
5. Making the questionnaire readable by using an appropriate font size, a simple design and straightforward words;
6. Trying to make the questionnaire as short as possible; and
7. Avoiding sending the questionnaire by email without also calling the respondents (to avoid wasting time). After sending the questionnaire by email, the respondents were reminded about it via phone, when they were asked whether they had received it and requested to return it. Twelve usable questionnaires were received by email and the remaining 38 were conducted in person.
4.10 Ethical considerations

According to Merriam (1998), ethical issues emerge in the data collection process. In the management and social science disciplines, ethics are directly linked with the integrity of the subject matter and with research (Bryman and Bell, 2007). In qualitative studies, ethical dilemmas are likely to emerge with regard to the collection of data and in the dissemination of findings (Merriam, 1998). In social science or management research, this is directly related to the integrity of the research and the subject matter (Bryman and Bell, 2007).

So in order to avoid ethical dilemmas, the researcher has to have an agreement prior to collecting data. A cover letter outlining the motives and purpose of the research study was sent to the participants and they were assured that their name as well as their company would be kept anonymous and would be dealt with in a highly confidential matter. Moreover, the researcher informed participants that they could withdraw at any time without having to give a reason. Furthermore based on the requirements of University of Portsmouth, the researcher has applied for an ethical approval prior conducting the study.

4.11 Chapter summary

This research study relied on the research process explained by Saunders et al. (2009); see Figure 4 Research process for this study (Saunders et al., 2009, p. 108). Therefore this study is based on a position of pragmatism, and inductive and deductive approaches were used to help reach the objectives of this research. The mixed method was adopted to avoid the weaknesses of a single method and to enhance credibility and validity by collecting data from multiple sources; the forms of validity used were triangulation, expert panel and pilot test. Several techniques were considered in this research, such as questionnaire, observation and interview, while the strategies employed were case study and survey.

Several issues have been discussed and covered in this chapter, such as research philosophy, approach, methodological choice, strategy and finally the techniques and procedures used for conducting data collection and the analysis of the data in order to justify the choice of each process in the research. Furthermore, this
chapter explained the tactics used to enhance the validity and to increase the response rate. It also shows how the difficulty faced in increasing the number of respondents was overcome, and how the bias that might have arisen was mitigated in order to enhance the validity and reliability of this research.
Chapter Five    Results and findings

5.1 Introduction

In this chapter, the data collected from respondents in Kuwait are discussed. Several techniques and sources have been used for the data gathering: the first phase used a questionnaire, the second phase entailed a semi-structured interview with 27 managers in K-SMMIs and observations in the same 27 K-SMMIs, the third phase conducted two case studies, and the fourth phase considered suggestions from an expert panel.

In order to answer the research questions and test the hypotheses, following the literature review, quantitative (questionnaire and structured observation) and qualitative (case studies, semi-structured interviews and observations) approaches were conducted. The data were gathered from different sources, such as managers in K-SMMIs, academics from Kuwait University, key personnel in governmental institutions, consultants, and quality practitioners, in order to provide rich, valid and reliable results.

The four phases made it possible to answer the research questions (RQs) and verify the results to ensure the results’ validity and reliability. This research posits six research questions, as follows:

1. RQ1: How far are K-SMMIs from a lean system?
2. RQ2: What factors relating to quality and management practices inhibit K-SMMIs from adopting a lean system?
3. RQ3: Why has a lean system not been practised within K-SMMIs to date?
4. RQ4: What is the urgency for K-SMMIs to adopt a lean system?
5. RQ5: What is the level of awareness of lean systems within K-SMMIs?
6. RQ6: What are the potential barriers and enablers for K-SMMIs to adopt a lean system?
5.2 Phase one: questionnaire

The initial phase of data collection used a quantitative survey method. Questionnaires were designed and distributed, and the responses received were entered into SPSS software to generate different analyses such as descriptive, Cronbach’s alpha (reliability test), Crosstab, independent sample t-test, and one-way ANOVA. This technique made it possible to test the hypotheses and answer RQ1, as well as to understand the demographics of the respondents to learn how certain variables or characteristics are affecting K-SMMIs’ readiness towards LS.

The following sections discuss these aspects based on outputs generated from SPSS advanced static software version 20. The discussions begin with demographic details pertaining to both the companies and the respondents. No personal information that discloses respondent identity was collected, or will be discussed here – the data collection was anonymous.

The questionnaire was developed to collect data fit for the purpose of study, which is exploratory and descriptive. K-SMMI firms were selected from the Kuwait Public Authority of Industries (KPAI) database as the population. There is currently no legal definition for K-SMEs, but they can be defined based on capital (small = 150,000 Kuwaiti Dinar (520,000 USD); medium = 150,000-500,000 Kuwaiti Dinar (520,000 -1,7 million USD) (Hertog, 2010)). In addition, Mady (2009) defined K-SMEs based on number of employees (small = fewer than 30 employees; medium = 31–70 employees; large = greater than 71 employees). In this research, both Hertog’s and Mady’s definitions have been used.

The respondents involved in the survey and in the interview are plant managers, production managers, quality managers and CEOs who are involved in decision making and have a good knowledge of their firm’s strategy and QI, and were willing to participate in the interview. In addition, the respondents chosen for interview had to have had at least five years’ experience working in Kuwait to ensure they have good knowledge and awareness of the Arabic culture, and thus would give useful answers.

The survey questionnaire consisted of three sections: (1) company background information, (2) information on the respondents, and (3) quality and
management practices used. Section 3 was divided into six constructs (47 statements): processes; planning and control; human resources; top management and leadership; customer relations; and supplier relations. The contents of section (3) were selected in order to assess the companies’ practices so that the preparedness and readiness towards the adoption of LS could be identified.

In order to provide valid and reliable results, this research study used a pilot test for both the questionnaire and the semi-structured interview questions, which ensured that the questions were as reliable and robust as possible. Before conducting the survey, the questionnaire and the interview questions were sent to academic members of Kuwait University, plus 15 firms who are similar to the target population. Their feedback led to some of the questions being removed or modified. After the modifications were made, the survey was distributed to 200 K-SMMIs who were randomly selected from the KPAI database. Valid responses were received from 50 firms, which equated to a response rate of 25 per cent. A total of 25 of these firms were ISO 9000 accredited.

Nordin et al. (2010) conducted a study on Malaysian manufacturing industries; their work was based on five lean practices (processes and equipment; manufacturing processes and control; human resources; supplier relations; and customer relations). With respect to whether the firms in their study considered quality and management practices to be important, the authors found that the total mean (M) score for firms who were practising LS was 4.29, while the total mean for non-lean firms was 2.81. This study followed a similar approach, but included top management and leadership as a construct. Therefore, it was assumed that the total mean score for firms who are successfully practising LS would be equal to or greater than 4 for each of the constructs (where such a score indicates that they do consider the constructs to be important). This will provide an understanding of whether the K-SMMIs consider the quality and management practices as important factors for their business.

To validate this assumption, the survey was sent to 15 successful lean manufacturing companies (all of which are large in size) in different regions (three from Kuwait, seven from Saudi Arabia, two from the UAE, two from Nigeria and one from the UK) to use as a proxy. It would have been more accurate to test the
survey on successful lean K-SMMIs, or SMMIs from the nearby region, but this was not possible due to a lack of K-SMMIs who are practising LS, and limitations on time. However, the quality and management practices used in his study are derived from different studies around the world, and it is believed that most of the elements in the questionnaire are important to LS regardless of the firms’ size and region.

The criterion used to select the 15 firms was that they were successfully using LS. In other words, they had to be satisfied with the results they had achieved after LS implementation; this was verified by contacting the firms’ managers via phone and email. The total mean score for the 15 firms was $M \geq 4$ for each construct, which shows that lean firms regard these practices as important for LS, supporting its use as a benchmark; this meant that firms who scored $M \geq 4$ in the main study could be considered ready to implement LS. It should be noted that the 15 firms were used purely to validate the assumption that a lean company would score $M \geq 4$, and were not used for comparison purposes.

The surveys used five-item Likert scales to identify the extent to which the company had adopted quality and management practices, and to set up valid and reliable numeric results for statistical analysis. Five-item Likert scales were chosen to give the participants the freedom to choose the appropriate rating for their current situation. For the first two constructs (processes, and planning and control), the scale was as follows: never (1), very rarely (2), sometimes (3), frequently (4) and always (5); for the remaining constructs the scale was: strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The responses were entered into SPSS software to conduct different statistical analyses, including a descriptive analysis, Cronbach’s alpha, independent sample t-test and one-way ANOVA.

5.2.1 Demographics: Company Background

Within the section on company background, 10 variables were provided: (1) age of company, (2) type of product produced, (3) legal structure of the company, (4) ownership structure, (5) number of employees, (6) ISO 9000 accredited (yes/no), (7) number of suppliers, (8) awareness of lean manufacturing system, (9) quality practices implemented, and (10) organisation type. The analyses are discussed below using pie and bar charts.
1. Firm age

The first variable was the age of the firm (in years). As shown in Figure 6, most of the firms (86 per cent) were more than 10 years old, while 6 per cent were in the 3–5 years age group 8 per cent were in the 5–10 group. Therefore, information was received from companies that have been in product manufacturing in Kuwait for many years, which suggested that their answers would be useful for the study.

![Figure 6 Firm Age](image)

2. Sector

In terms of the types of products being manufactured, most fall into Sector 2 (chemicals, petroleum products, coal and rubber) at 36 per cent, as indicated in Figure 7. There are 32 per cent within Sector 1 (paper, paper products and printing), and a further 18 per cent and 14 per cent in Sector 3 (non-metallic minerals except petrol activity) and Sector 4 (metal product machinery and equipment activity), respectively. This represents a variety of sectors, which will reveal whether the type of product affects the use of quality practices and the firms’ readiness towards LS.
3. Legal structure

Figure 8 displays the firms’ legal structure. There are many local companies in Kuwait that are family-owned and operated and others who have different ownership structures. The legal and ownership structure of the firm affects the decision-making process and also the internal structure of the firm. From the responses, it is clear that most of the firms are limited liability companies (52 per cent), with the remaining 48 per cent indicating that they are shareholding firms.
4. Ownership structure

From Figure 9, it can be seen that most of the firms are family owned (62 per cent) with 38 per cent non-family-owned firms. The ownership structure might affect the firms’ performance, as well as affecting their motive for adopting QI, as shown in Chapter 2. Using a sample consisting of 62 per cent family- and 38 per cent non-family-owned firms will help to identify whether this factor affects readiness towards LS.

5. Firm size
Most of the firms (54 per cent) are considered as medium-sized, while 46 per cent are small companies. This will help to support or disprove other studies that have found a difference in terms of size between companies adopting quality practices, and will also identify which firms – small or medium – have better readiness towards LS.

![Firm size](image)

**Figure 10 Firm size**

### 6. ISO 9000-certified and non-ISO 9000-certified firms

Figure 11 indicates that 50 per cent of the firms are ISO 9000 certified. This indicates that some kinds of quality and management practices are being implemented and used in these firms. This will help in drawing a comparison between these firms to see if ISO 9000 has an impact on LS readiness.
7. Number of suppliers

Suppliers are key players with respect to LS, as was shown in the literature review chapter, since having strong relations with suppliers could help organisations to more easily manage their resources. Number of the suppliers can also be a factor in building strong relations, and many researchers have advised that maintaining a small number of suppliers leads to more effective LS.

Based on the results in Figure 12, it can be seen that 96 per cent of the firms had more than five suppliers, followed by 2 per cent who indicated that they have less than three, and a further 2 per cent stating that they have between three and five. This factor may affect their supplier relations, and this will be examined in the following sections.
8. Awareness of lean system

One of the most prominent questions of this research is provided in Figure 13. This research is about LS, and from the results it can be seen that only 28 per cent indicated a knowledge of LS.
9. Quality and management practices already implemented

Figure 14 shows that 70 per cent of firms are not using quality and management practices in their processes, which is disappointing as the practices shown in Figure 14 are part of LS. However, considering the results shown in Figure 13, this is understandable as the majority of firms are not aware of LS. This point will be explained thoroughly after running the statistical analyses to understand what quality and management practices are been implemented and practiced by K-SMMIs.

![Figure 14 Quality and management practices already implemented](image)

10. Organisational type

Within a manufacturing environment there are various opinions that must be considered as the manufacturing is broken down into various stages and phases. Therefore, it is important for a manufacturing organisation to practise a style in which the opinions of the team are taken into consideration before a product is manufactured. This could include people from the shop-floor level up to the top management, as most of these staff are professionals with experience in their respective fields. LS requires involvement and empowerment, as well as input from workers within the whole organisation. Figure 15 indicates that 50 per cent of the respondents consider their organisation as participative, while 30 per cent consider it
to be bureaucratic and 18 per cent consultative. The participative style could work very well within the LS environment, as it welcomes teamwork and input from employees across all levels within the organisation. However, this is of course subject to certain practices, and the questionnaire was intended to identify whether the K-SMMIs are using a participative style.

![Organisational Type](image)

**Figure 15 Organisational Type**

### 5.2.2 Demographics: Respondent Background

The respondent section had six variables: (1) gender, (2) total years of experience, (3) years of employment with the current firm, (4) current job position/title, and (5) education level. These are discussed here using bar and pie charts.

1. **Gender**

   Based on Figure 16, most of the respondents are male (96 per cent), which is probably due to the physical demands that manufacturing sectors place on employees.
2. **Total years of experience**

Based on the results in Figure 17, 76 per cent of the respondents have had experience of over 10 years. This is promising in terms of the aims of the present research, as the results will come from people who are highly experienced in the field, which will contribute on the validity of the outcomes.
3. Years of employment in this firm

This question was asked to ensure that results were coming from people who had a good level of knowledge about their companies. Figure 18 indicates that the majority of the respondents (38 per cent) had more than 10 years’ experience in their current position, which again gives confidence that the answers are coming from people who know what they are talking about.

![Figure 18 Years of employment in this firm](image)

4. Job position/current title

Figure 19 displays the job positions of the respondents. In the questionnaire, the following job positions/titles were provided in addition to an “others” category: CEO/managing director; quality control manager; production manager; inventory manager; and supervisor. Responses were received only for production manager (74 per cent), CEO/managing director (10 per cent), quality control manager; and supervisor (8 per cent each). It can be said that the questionnaire was completed by key personnel within the firm, who must therefore be aware of the firm’s strategy and the key aspects addressed in this study.
5. Education level

As per the education levels shown in Figure 20, most of the respondents (82 per cent) have a bachelor’s degree, followed by 10 per cent with a master’s/PhD. Again, this increases confidence that the questionnaire was answered by well-educated people.
### 5.2.3 Cronbach’s alpha value for the variables

The reliability analysis was carried out by identifying the Cronbach’s alpha values. The alpha scale ranges from 0 to 1, and values above 0.70 are considered to be reliable and sufficient (Schutte et al., 2000).

The test was conducted to estimate the internal consistency of the 47 items. Table 31 indicates that the Cronbach’s alpha value for the total scale was 0.929, while each variable scored above 0.7, indicating a high degree of internal consistency among the items on the scale.

Based on the results in Table 31, the alpha value for the entire data set was 0.929 for all five-point Likert scale statements (47 statements in total). The reliability of the variables was calculated separately; based on the accepted value of 0.7 and 1.000, all the variables were accepted and considered strongly reliability (Process (PR)=0.87; Planning and control (PC)=0.76; Customer relations (CU)=0.79; Supplier relations (SU)=0.78; Human resources (HR)=0.87; Top management and leadership (MGT)=0.74). Thus there is good data reliability.

#### Table 31 Reliability test for all variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
<th>Number of Items</th>
<th>Statements Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>0.87</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>PC</td>
<td>0.76</td>
<td>5</td>
<td>None</td>
</tr>
<tr>
<td>CU</td>
<td>0.79</td>
<td>6</td>
<td>None</td>
</tr>
<tr>
<td>SU</td>
<td>0.78</td>
<td>8</td>
<td>None</td>
</tr>
<tr>
<td>HR</td>
<td>0.87</td>
<td>11</td>
<td>None</td>
</tr>
<tr>
<td>MGT</td>
<td>0.74</td>
<td>5</td>
<td>None</td>
</tr>
<tr>
<td>All variables</td>
<td>0.929</td>
<td>47</td>
<td>None</td>
</tr>
</tbody>
</table>

### 5.2.4 Descriptive analysis

Descriptive analysis is used to understand the cumulative response rate of each statement. The results below are provided in both numbers and percentages, while in
some cases the positive results were accumulated (e.g. “strongly agree” added to “agree”) and compared with the total negative results (e.g. “strongly disagree” combined with “disagree”) to give a better understanding and a clearer picture. The discussion will be based on the percentage figures.

1. Process (PR)

Table 32 shows the total mean for the 12 statements within the “process” variable (PR01, PR02, PR03, PR04, PR05, PR06, PR07, PR08, PR09, PR10, PR11, and PR12). Based on the five-point Likert scale (1= Never; 2= Very rarely; 3= Sometimes; 4= Frequently; 5= Always), the mean results indicate that most of the responses fall into the “Sometimes” category. Further, Table 33 shows the mean (M) and standard deviation (SD) values for the 12 items; from this table it can be seen that PR01 is most frequently practised by K-SMMIs, while PR10 is the least practised.

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR01 PR02 PR03 PR04 PR05 PR06 PR07 PR08 PR09 PR10 PR11 PR12</td>
<td>4.18 2.84 2.82 3.82 2.96 3.1 3.02 3.78 3.02 1.58 2.56 3.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1.11</td>
<td>1.40</td>
<td>1.69</td>
<td>1.36</td>
<td>1.79</td>
<td>1.51</td>
<td>1.25 1.47</td>
</tr>
</tbody>
</table>

In order for K-SMMIs to be ready for LS, they need to have good processes in place in terms of having an organised workplace and cellular manufacturing; processes that follow a flow and are based on customer demands; clear standards; and thorough records of important figures, such as cycle time, so that they can monitor and improve. Equally important is that they must follow a clear strategy to keep their machines and equipment in good working condition. The next section will shed the light on how K-SMMIs are doing with respect to their processes.
Within the“Process” variable, 12 items related to the processes are followed by K-SMMIsare discussed. Table 34 shows the results obtained from K-SMMIs for each element. This begins with PR01, which aimed to identify whether the firms divide their workplace based on the requirements of the task. Based on the responses, most of the firms (50 per cent) “Always” use such division, while 36 per cent “Frequently” do. This indicates that the most of the firms divide their workplaces based on tasks, and that each zone has a specific job to do. In turn, this reveals that the various processes are split across different workplaces, with each of the designated areas having specific work to do in most of the K-SMMIs. The processes are organised in such a way that sections are associated with each other seamlessly and jobs that have similar functions are close to each other. The basic structure of the manufacturing segment can be understood from these responses, and is also a positive indication as LS requires designation in order to cut wastes such as motion, which might result from workers’ movement during the process.

PR02 will reveal whether the firms are following the cellular manufacturing method, which is a key part of LS. In this regard, 38 per cent of the respondents showed that they “Very rarely” use cellular manufacturing, and 18 per cent selected “Never”, which means that 56 per cent in total provided negative responses (i.e. the K-SMMIs either have never, or have rarely, used cellular manufacturing). On the other hand, 44 per cent of the firms’ respondents replied positively in relation to cellular manufacturing; 30 per cent selected “Frequently”, and 14 per cent chose “Always”. In summary, this means that some of the firms use cellular manufacturing and the rest do not.

PR03 shows that the working zone and the processes are not run by highly qualified or well-trained workers, as the 32 per cent of the respondents showed that they do not have skilled people in this regard. If the negative responses are added together, the result is 58 per cent who do not use skilled people to run their processes; on the other hand, 42 per cent of the firms stated that their processes are run by skilled people. Skilled people are highly required within LS.

One foundation of LS is 5s, which can be adapted to many different forms – one of which refers to equipment and items, and states that the working area should have the required equipment only. From PR04, the majority of firms (40 per cent)
were found to “Always” follow this maxim, while 36 per cent do so “frequently”, which indicate that the firms do consider this factor as an important part of their processes.

PR05 shows that production within the firms is not based on demand from the next station or the next stage of the process, as 38 per cent selected “Never” in this regard and 12 per cent chose “Very rarely”, which is not positive as it could result in buffering or miscommunication between stations. LS insists on working based on demand – either from the next stage or from the customer – and in this case the K-SMMIs are missing this point, which causes wastes and results in non-value-added activities, in contrast with lean principles.

For PR06 48 per cent of the respondents selected “Frequently” and 14 per cent chose “Always”, which means that K-SMMIs ensure that they return equipment and items back to where they belong by assigning them to specific people, which helps to maintain a smooth workflow and makes things easier for the next shift. This is a form of 5s, which represents a key aspect of LS.

In order for firms to avoid machine and equipment breakdown they must have planned maintenance, since TPM is a key aspect of LS. In PR07 it was shown that 32 per cent of the firms “Frequently” have such a system in place, while 14 per cent “Always” do. On the other hand, 46 per cent of the firms indicated negatively in response to this – i.e. 28 per cent chose “Never” and 18 “Very rarely”. This yields a mixed response, as more than half of the firms show a great awareness towards maintaining their machines by posting equipment maintenance records, while 46 per cent are ignoring this aspect. However, PR10 shows that the vast majority of the firms (52 per cent) who selected “Never” and “Very rarely” (42 per cent) do not have scheduled maintenance times. This means that the K-SMMIs do not have a great awareness of TPM.

The results for PR08 show that the process flow of material and equipment are smooth, as the equipment is grouped based on similar operations; this can be understood from the fact that 82 per cent (56 frequently + 26 always) of firms have continuous flow.
Production based on customer demand is one of the prime objectives of LS, and entails using “pull” and “JIT”. LS requires firms to work based on customer demand and to do only what the customer has asked for, while pull is one of main lean principles. From the responses to PR09 it can be seen that 60 per cent (50 Frequently + 10 Always) of the firms are working based on customer demand, and this is highly positive for K-SMMIs.

Documentation is important for LS. From the responses to PR11 it can be seen that there is no proper documentation within most of the K-SMMIs, as 60 per cent (38 Never + 22 Very rarely) suggested that they do not have a documentation system for machine and equipment, while 40 per cent do have a well documented system for keeping machine records and configuration notes. Keeping a record of cycle time is very important in terms of monitoring the process pace, and the results of PR12 show that 56 per cent of the firms are monitoring the cycle time for each product. However, 40 per cent are not keeping records of the cycle time, which gives a mixed response overall. This should be investigated at a later stage.

This variable highlights many negative and positive practices carried out within K-SMMIs, but when looking at the bigger picture it is possible to see that many things need to be considered by K-SMMIs that are important towards LS. For example, the overall M score lies in the “Sometimes” range, and this is not a good indicator that firms are ready for LS. Some of these aspects relate to TPM, which should be run by skilled workers, and documentation, which is also important and required by LS. In addition, failure to address these issues will affect other operations; in other words, machines might work well, but will not last forever unless there is periodic maintenance, and, in order to avoid the breakdown or malfunction of the machine and equipment, there is a need to have a proper maintenance system in place.
### Table 34 Descriptive statistics for process variables

<table>
<thead>
<tr>
<th>Items</th>
<th>Never</th>
<th>Very Rarely</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>PR01</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>PR02</td>
<td>9</td>
<td>18</td>
<td>19</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td>PR03</td>
<td>16</td>
<td>32</td>
<td>13</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>PR04</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>PR05</td>
<td>19</td>
<td>38</td>
<td>6</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>PR06</td>
<td>14</td>
<td>28</td>
<td>5</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>PR07</td>
<td>14</td>
<td>28</td>
<td>9</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>PR08</td>
<td>6</td>
<td>12</td>
<td>3</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>PR09</td>
<td>14</td>
<td>28</td>
<td>6</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>PR10</td>
<td>Machine operators and staff are engaged in the scheduled maintenance of equipment so that machines are maintained on a regular basis by skilled people.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR11</td>
<td>There is a well-documented configuration setting for each machine/piece of equipment to avoid uncertainty about how to reconfigure the equipment during changeover.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR12</td>
<td>The total cycle time is revised for each product on a regular basis in order to reach the optimum level.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>26</th>
<th>52</th>
<th>21</th>
<th>42</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>4</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>38</td>
<td>11</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>26</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>13</td>
<td>26</td>
<td>7</td>
<td>14</td>
<td>2</td>
<td>4</td>
<td>13</td>
<td>26</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>
2. Planning and control (PC)

Table 35 shows the total mean for the 5 statements within the planning and control variable (PC01, PC02, PC03, PC04, and PC05). Based on the five-point Likert scale (1= Never; 2= Very rarely; 3= Sometimes; 4= Frequently; 5= Always), the results of mean indicate that the overall responses fall into the “Sometimes” option. Further, Table 36 shows the M and SD for the five items; from this table it can be seen that PC03 is the practice most frequently followed by K-SMMIs, while PC05 is the least-followed practice.

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.01</td>
<td>2.02</td>
<td>4.08</td>
<td>2.06</td>
<td>2.02</td>
<td>0.65</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 35 Planning and control summary item statistics

Table 36 Planning and control: mean and standard deviation for each item

<table>
<thead>
<tr>
<th>N=50</th>
<th>PC01</th>
<th>PC02</th>
<th>PC03</th>
<th>PC04</th>
<th>PC05</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>2.86</td>
<td>3.54</td>
<td>4.08</td>
<td>2.56</td>
<td>2.02</td>
</tr>
<tr>
<td>SD</td>
<td>1.64</td>
<td>1.5</td>
<td>1.24</td>
<td>1.35</td>
<td>1.39</td>
</tr>
</tbody>
</table>

Several aspects need to be taken into account to be able to perform LS. K-SMMIs must have problem solving techniques, benchmark themselves against other industries, and have standards in place. They also need to engage their workers by having VM and KPI in the working area to keeping workers up-to-date with changes and schedules. In the section below, the scores for the five elements are revealed.

Table 37 shows the descriptive statistics for the planning and control variables. Based on the responses shown in Table 37 for PC01, 50 per cent (34 Never + 16 Very rarely) of the firms do not use focus groups to help them improve their processes and eliminate wastes, while 48 per cent (26 Frequently + 22 Always) consider themselves as having a focus group for solving problems and eliminating non-required activity. As was learned from the previous chapters, focus groups for solving problems is an important aspect for LS.
As it stands, the percentages of PC01 are almost the same, which means that nearly half of the firms are following the right steps towards LS. The responses to PC04 reveal more about the problem-solving techniques used in K-SMMIs; they show that the majority of firms do not follow clear problem-solving techniques, however 44 per cent do.

With regard to benchmarking, responses to PC02 reveal that 72 per cent (40 Frequently + 30 Always) of the firms are aware of the top-class firms around them, and are benchmarking themselves against them, which again represents a great awareness from the firms of ways in which to improve. Moreover, Table 37 shows, in response to PC03, that the vast majority of the firms are following clear standards in terms of where to load raw materials and removing end products. This shows some positive aspects of K-SMMIs with respect to LS, as LS requires an understanding of the standards and benchmarking against other firms.

The results for PC05 also show that the vast majority of the firms are not using VM or KPIs on the shop floor, or maybe do not consider these to be an important aspect of their processes. VM is a key aspect of LS; it helps to make everything visible in the workplace, while preventing employees from wasting their time searching for information by making the right information visible to everyone.

This variable demonstrates a mix of responses, some of which were good and supportive of LS, while others were unsupportive. From the total M score for this variable, it can be seen that it lies within the “Sometimes” part of the scale. In order for the K-SMMIs to be ready for LS, they must get most practices right, as these practices represent a foundation for LS, as discussed in Chapters 2 and 4.
Table 37 Descriptive statistics for planning and control variables

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC01</td>
<td>17</td>
<td>34</td>
<td>8</td>
<td>16</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>26</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>PC02</td>
<td>10</td>
<td>20</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>42</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>PC03</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>36</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>PC04</td>
<td>17</td>
<td>34</td>
<td>10</td>
<td>20</td>
<td>1</td>
<td>2</td>
<td>22</td>
<td>44</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PC05</td>
<td>28</td>
<td>56</td>
<td>9</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

In order to improve production, a focus group of workers is conducted (on a regular basis) to help the company identify wastes and solve problems by generating new ideas and solutions, which are then submitted to the managers.

There is an awareness of the wider industry performance, and a clear strategy is followed to benchmark performance with the top-class firm (at a domestic and national level).

There are standard routes for loading raw materials and removing end products, including a standard picking time.

Problem-solving techniques such as Fishbone diagrams are used to identify the causes of quality problems.

Up-to-date charts showing defect rates, key performance indicators, progress and next job activity are displayed on the shop floor.
3. Customer relations (CU)

Table 38 shows the total mean for the six statements within the customer relations variable (CU01, CU02, CU03, CU04, CU05, and CU06). Based on the five-point Likert scale (1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5=Strongly agree), the mean results indicate that, overall, the responses fall into the “Disagree” end of the scale. Further, Table 39 shows the M and SD scores for the six items; from this table it can be seen that CU01 is the practice most frequently followed by K-SMMIs while CU06 is the least-followed practice.

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU01</td>
<td>3.96</td>
<td>2.22</td>
<td>2.16</td>
<td>0.997</td>
<td>0.98</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>CU02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU03</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU06</td>
<td>2.06</td>
<td>1.19</td>
<td>1.20</td>
<td>0.54</td>
<td>0.98</td>
<td>1.09</td>
<td></td>
</tr>
</tbody>
</table>

Customer satisfaction is one of the strongest objectives for any organisation. Maintaining good relations with customers is always good for keeping them happy. LS requires organisations to produce based on customer demand, and to know exactly what the customer is willing to pay for. In order to do this, K-SMMIs must have strong relations with customers by engaging them in the product design, inviting them to the workplace, conducting surveys, taking customer feedback seriously, and incorporating feedback and complaints. In the following section, the responses obtained from the K-SMMIs are highlighted for the six elements related to customer relations.

Table 40 shows the descriptive statistics for customer relations variables. The responses to CU01 show that the vast majority of the firms agreed to having good customer awareness and knowing what their customers are willing to pay for, which is highly required by LS. However, the responses to CU02 show otherwise, as 78 per
cent of the firms do not have great communication with their customers in terms of taking customer feedback, meeting with customers, and conducting surveys.

Further, Table 40 shows that with regard to customer involvement (CU03), 74 per cent of the firms are not involving their customers in the product design, and this may affect the firm’s understanding of the customer needs.

Similarly, in CU04 the responses show that the vast majority of the firms are not inviting their customers to their plant, which again indicates a weak relationship between the firms and their customers. On the other hand, the customer are not helping the firms, as the responses to CU05 show that 80 per cent of the firms suggested that their customers are not sharing their future plans with the firms’ management. This could be a result of the fact that the firms do not heavily involve their customers in their plans either, and do not work hard to build relations with customers, as can be seen from their responses to CU02, CU03, and CU04.

Finally, in response to CU06, it can be seen that the firms do not have proper systems in place to collect customer complaints. Dealing with customer complaints is always good to build relationships with customers, and failures in this regard might lead losing customers.

This variable shows many negative practices by K-SMMIs that are not supportive of LS, as it can be observed that the total M score lies on the “Disagree” end of the scale. Customers are key players for LS, and keeping tight relations with them leads to many good things that firms can benefit from. However, maintaining strong relations with customers requires huge efforts from firms. As it stands, K-SMMIs are not doing enough to maintain good customer relations.
Table 40 Descriptive variables for customer relations variables

<table>
<thead>
<tr>
<th>Items</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>CUO1</td>
<td>There is an awareness of what product features customers value and are willing to pay for.</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>CUO2</td>
<td>Feedback is sought regularly, and surveys/meetings are often held with customers to improve product design and quality, and service.</td>
<td>13</td>
<td>26</td>
<td>26</td>
<td>52</td>
</tr>
<tr>
<td>CUO3</td>
<td>Customers participate in the initial design process.</td>
<td>18</td>
<td>36</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td>CUO4</td>
<td>Valued customers are brought in to visit the plant in order to give them some ideas about quality control that the company can follow.</td>
<td>11</td>
<td>22</td>
<td>29</td>
<td>58</td>
</tr>
<tr>
<td>CUO5</td>
<td>Customers help the company by providing information about their future demands.</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>CUO6</td>
<td>There is a system in place for collecting customer complaints so that problems can be avoided in the future.</td>
<td>18</td>
<td>36</td>
<td>21</td>
<td>42</td>
</tr>
</tbody>
</table>
4. Supplier relations (SU)

Table 41 shows the total mean score for the eight statements within the supplier relations variable (SU01, SU02, SU03, SU04, SU05, SU06, SU07, SU07, and SU08). Based on the five-point Likert scale (1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5=Strongly agree), the mean results indicate that, overall, the responses are in the “Disagree” area of the scale. Further, Table 42 shows the M and SD for the eight items; from this table it can be seen that SU05 is the practice most frequently followed by K-SMMIs, while SU02 is the least-followed practice.

Table 41 Supplier relations summary item statistics

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU01</td>
<td>2.27</td>
<td>1.56</td>
<td>3.92</td>
<td>2.36</td>
<td>2.51</td>
<td>0.49</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 42 Supplier relations: mean score and standard deviation for each item

<table>
<thead>
<tr>
<th></th>
<th>SU01</th>
<th>SU02</th>
<th>SU03</th>
<th>SU04</th>
<th>SU05</th>
<th>SU06</th>
<th>SU07</th>
<th>SU08</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1.94</td>
<td>1.56</td>
<td>1.98</td>
<td>2.22</td>
<td>3.92</td>
<td>2.32</td>
<td>2.24</td>
<td>2.02</td>
</tr>
<tr>
<td>SD</td>
<td>1.01</td>
<td>0.7</td>
<td>1.11</td>
<td>1.14</td>
<td>1.12</td>
<td>1.20</td>
<td>0.98</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Supplier relations has a key role in LS, as it helps in performing JIT and ensuring product quality. Thus, organisations that are interested in adopting LS must get this aspect right and have strong relations with suppliers. This can take many forms, such as involving suppliers in product design, using suppliers that are close to avoid delays in shipments, having a small number of suppliers, ensuring raw materials come from quality suppliers, and providing suppliers with feedback. The following section will shed light on the K-SMMIs’ relations with their suppliers.

Table 43 shows the descriptive statistics for supplier relations variables. The SU01 responses indicate that the vast majority of Kuwaiti firms do not have a clear strategy to evaluate their suppliers with regards performance in terms of quality, delivery and prices. The responses for SU02 show that most of the K-SMMIs (96 per
cent) do not see dealing with local suppliers as an advantage for their business. Using proximally close suppliers (i.e. local suppliers) is always good to help firms receive the required items and materials on time, and this is essential for JIT and for keeping low levels of inventory, since instead of ordering safety stock the firm can order only the required items and materials; of course, this requires strong relations with suppliers. Whereas for international suppliers, orders have to be placed with due consideration of time, and adequate stock has to be maintained by the manufacturers as backup.

Further, from the responses to SU03 it can be seen that the K-SMMIs are not involving their suppliers in their product design, as is shown from the high percentage (82 per cent) of responses in this regard. By involving suppliers in product design the firms can save a lot, as the suppliers might be able to provide the firm with a better solution which could save them time and effort, along with better-quality products. K-SMMIs seem to be missing this important aspect.

With regard to the quality of suppliers, most of the K-SMMIs agreed that they are not receiving good materials from their suppliers, as shown from the SU04 responses. This results in carrying out inspections for each delivery, which of course is considered a waste as far as LS is concerned, as this step does not add value to the end customer.

Similarly, most of the firms agree that they are not receiving materials at the right time, and this can be seen from the responses to SU06, as 72 per cent of the firms said that they are not happy with their deliveries. Further, the responses to SU05 reveal that most of the K-SMMIs (80 per cent) are working towards reducing their numbers of supplier; as far as LS is concerned, this step will help the firms to build better relations with suppliers, as focusing on keeping the number of suppliers low might help to improve service and quality.

Sometimes dealing with suppliers is not an easy task, and the firms are not only ones to be blamed for the failures in terms of good relations. In SU07, most of the firms (78 per cent) said that their suppliers are not cooperative towards maintaining long relationships. However, from the responses to SU08 it can be seen that the K-SMMIs are also not doing enough to keep the relationship tight, since the
responses to this question show that 80 per cent of the firms are not providing their suppliers with feedback.

This variable indicates a lot of negatives towards LS, as can been seen from the total M score, which lies on the “Disagree” end of the scale. In order for any organisation to implement LS it must have a great relationship with its suppliers, but in the Kuwaiti case this is not reflected.
Table 43 Descriptive statistics for supplier relations variable

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU01</td>
<td>A clear strategy is in place by which to evaluate supplier performance in terms of quality, delivery and prices.</td>
<td>19</td>
<td>38</td>
<td>23</td>
<td>46</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SU02</td>
<td>Local suppliers are used to avoid shipment delays.</td>
<td>26</td>
<td>52</td>
<td>22</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SU03</td>
<td>Suppliers are aware of product designs and participate heavily during design and development.</td>
<td>20</td>
<td>40</td>
<td>21</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>16</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>SU04</td>
<td>Raw materials and purchased parts are not subject to incoming inspection as they come from qualified suppliers.</td>
<td>13</td>
<td>26</td>
<td>26</td>
<td>52</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>18</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>SU05</td>
<td>Active steps are taken to reduce the number of suppliers in each category.</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>29</td>
<td>58</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>SU06</td>
<td>Raw materials are received on time from the date of order.</td>
<td>13</td>
<td>26</td>
<td>23</td>
<td>46</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>22</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>SU07</td>
<td>Suppliers are cooperative and committed to maintaining a long-term relationship.</td>
<td>9</td>
<td>18</td>
<td>30</td>
<td>60</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SU08</td>
<td>Suppliers are provided with feedback regarding quality and delivery performance.</td>
<td>19</td>
<td>38</td>
<td>21</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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5. HR

Table 44 shows the total mean score for the 11 statements within the HR variable (HR01, HR02, HR03, HR04, HR05, HR06, HR07, HR08, HR09, HR10, and HR11). Based on the five-point Likert scale (1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5=Strongly agree), the mean results indicate that, overall, the responses are on the “Disagree” end of the scale. Further, Table 45 shows the M and SD for the 11 items; from this table it can be seen that HR07 is the practice most frequent followed by K-SMMIs while HR09 is the least-followed practice.

Table 44 HR summary item statistics

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.99</td>
<td>1.66</td>
<td>3.86</td>
<td>2.20</td>
<td>2.32</td>
<td>0.34</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 45 HR: mean score and standard deviation for each item

<table>
<thead>
<tr>
<th>HR01</th>
<th>HR02</th>
<th>HR03</th>
<th>HR04</th>
<th>HR05</th>
<th>HR06</th>
<th>HR07</th>
<th>HR08</th>
<th>HR09</th>
<th>HR10</th>
<th>HR11</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>2.92</td>
<td>2.86</td>
<td>3.86</td>
<td>2.96</td>
<td>3.22</td>
<td>3.78</td>
<td>3.02</td>
<td>1.66</td>
<td>2.56</td>
<td>3.12</td>
</tr>
<tr>
<td>SD</td>
<td>1.35</td>
<td>1.67</td>
<td>1.79</td>
<td>1.41</td>
<td>1.59</td>
<td>1.25</td>
<td>1.47</td>
<td>0.77</td>
<td>1.55</td>
<td>1.68</td>
</tr>
</tbody>
</table>

It was highlighted in Chapter 2 that HR is very important for LS. Toyota place value on this factor and worked hard to achieve it; indeed, one of Toyota’s main pillars is “respect for people”, which is reflected in many forms, such as employee empowerment and involvement, keeping employees motivated, providing employees with training, and promoting teamwork. The following section will see how K-SMMIs are dealing with HR.

Table 46 shows the descriptive statistics for the HR variables. The responses to HR07 show that the K-SMMIs are working hard to make their employees understand their jobs and responsibilities, as shown from the 82 per cent who agreed that each worker understands his/her role within the firm.

From HR01 it can be seen that 52 per cent of the K-SMMIs are not taking employees’ suggestions into account to improve the work, and this is not promising
with regard to employee involvement, which is a requirement for LS. Only 44 per cent of the firms see it as important to improve work based on input from workers.

HR10 yielded similar responses, since the majority (60 per cent) of firms do not implement suggestions made by their workers.

Contrary to HR10, the responses to HR03 show that 76 per cent of the firms believe that employees on the shop floor are driving suggestions programmes, and this suggests that the K-SMMIs are asking their employees to provide suggestions and recommendations to improve the work, but their suggestions are largely ignored. This can also be seen in the responses to HR09, as the vast majority of firms (90 per cent) stated that their workers do not have the authority to take action when needed in their work, which shows that they do not empower their workers. The mixed responses can be seen as arising either from the fact that top management do not trust their employees, or the fact that the workers are not good enough to be trusted.

The responses to HR04 were also mixed: 50 per cent of the firms do not have an awards and incentives programme in place to motivate workers, while the other firms do have a rewards system. The literature review chapter highlighted that keeping people motivated is conducive to making them work to their maximum capacity, and helps to contribute to developing the work process.

Skilled and multi-tasking workers, and the ability to work as a team, is required by LS; the responses to HR05 show that 62 per cent of firms believe their workers are qualified enough and skilful enough to contribute to problem solving. However, in response to HR02 56 per cent of the firms feel their employees are not able to perform different tasks.

From the responses to HR11 it can be seen that 56 per cent of the firms believe their employees are working based on group interest, and this can also be identified from the responses to HR06, as 54 per cent of the firms have good relations at both employee and departmental level. That represents mixed responses, since most of the firms are supportive towards LS in some areas but not others.

The responses to HR08 reveal that 60 of the firms offer their employees quality training to enable them to contribute to problem solving and identify non-value-added activities, while 40 per cent do not.
In this variable some positive and negative signs from K-SMMIs have identified, however the total M score is unfavourable as it lies on the “Disagree” end of the scale. Key features, such as motivation, empowerment, involvement, skills and multitasking workers are highly valued in LS. In the K-SMMIs’ case it was found that they are lacking some of these key aspects, which might affect their readiness towards LS. Further investigation should be carried out to understand the reason behind the lack of empowerment, motivation and employee involvement within K-SMMIs.
<table>
<thead>
<tr>
<th>Items</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>HR01</td>
<td>Workspace layout is reconfigured regularly based on feedback from employees.</td>
<td>7</td>
<td>14</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td>HR02</td>
<td>Workers are able to perform different tasks.</td>
<td>15</td>
<td>30</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>HR03</td>
<td>Shop-floor employees drive suggestion programme.</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>HR04</td>
<td>Numerous awards, incentive programmes and annual bonuses are available for employees who help to improve processes and eliminate unnecessary steps. The evaluation is based on group performance.</td>
<td>19</td>
<td>38</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>HR05</td>
<td>Workers are qualified enough to contribute to solving problems, and are able to work as a team.</td>
<td>11</td>
<td>22</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>HR06</td>
<td>Departmental and employee relations are good, and conflict barely occurs.</td>
<td>14</td>
<td>28</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>HR07</td>
<td>Each employee has a clear understanding of his job description.</td>
<td>6</td>
<td>12</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>HR08</td>
<td>Employees have undergone quality training in terms of developing their problem-solving capabilities and identifying non-value-adding activities.</td>
<td>14</td>
<td>28</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>HR09</td>
<td>Workers are empowered to stop the production line if abnormalities occur.</td>
<td>24</td>
<td>48</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Suggestions and ideas from shop-floor employees are actively used and implemented.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR10</td>
<td></td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>employees</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>are</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>actively used</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and implement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Employees act according to the interests of the group, rather than their individual interests.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HR11</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>employees</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>act according to the interests of the group, rather than their individual interests.</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>
6. Top management and leadership (MGT)

Table 47 shows the total mean score for the five statements within the top management and leadership variable (MGT01, MGT02, MGT03, MGT04, and MGT05). Based on the five-point Likert scale (1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5=Strongly agree), the mean results indicate that, overall, the responses lie within the “Neutral” area of the scale. Further, Table 48 shows the M and SD for the six items; from this table it can be seen that MGT01 is the practice most frequently followed by K-SMMIs, while MGT04 is the least-followed practice.

Table 47 Top management and leadership summary item statistics

<table>
<thead>
<tr>
<th>Item Means</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.20</td>
<td>2.30</td>
<td>4.26</td>
<td>1.96</td>
<td>1.85</td>
<td>0.506</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 48 Top management and leadership: mean score and standard deviation for each item

<table>
<thead>
<tr>
<th></th>
<th>MGT01</th>
<th>MGT02</th>
<th>MGT03</th>
<th>MGT04</th>
<th>MGT05</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>4.26</td>
<td>3.38</td>
<td>3.10</td>
<td>2.98</td>
<td>2.30</td>
</tr>
<tr>
<td>SD</td>
<td>0.96</td>
<td>1.51</td>
<td>1.68</td>
<td>1.51</td>
<td>1.35</td>
</tr>
</tbody>
</table>

Top management and leadership is the most important factor for LS, as acknowledge by several researchers (e.g. Chin and Pun, 2002; Angelis et al., 2011; Bakås et al., 2011; Zu et al., 2010; Mefford, 2009; Kumar et al., 2009; Achanga et al., 2006; Panizzolo, 1998; Meredith et al., 1991; Snee, 2010). Without top management commitment LS cannot be established, and without leadership LS cannot be sustained. Important factors such as visible management (Gemba), commitment, knowing people’s capabilities, committing to providing training, and investment in consultants and expertise can help the organisation to improve, and avoid wastes such as “wasted talent”. The following section will identify whether the K-SMMIs have good quality and management practices towards LS.
One of the important factors required by LS is visible management, or “Gemba”. Table 49 shows the descriptive statistics for the top management and leadership variables. The responses to MGT01 show that 94 per cent of the firms consider this practice, and 44 per cent always adopt it. This practice is good to keep employees motivated and to identify any problems on site, as followed closely by Toyota.

Knowing people’s capabilities is another important practice that helps to prevent wasted talent. By knowing people’s capabilities, top management and leaders can easily assign the right people to the right tasks. MGT02 shows that 70 per cent of the firms acknowledge this practice and believe they know the capabilities of each worker; however 30 per cent of the firms do not see it as important.

Commitment from top management is highly required by LS. This can take many forms, such as investing in training and investing in expertise and consultants. MGT04 shows that 50 per cent of the firms are committed towards investment in training and encouraging cross-job training, while the remaining 50 per cent ignore this aspect. In terms of using expertise and consultants, the responses to MGT05 show that the majority of the firms (70 per cent) are not investing in consultants and expertise.

Another practice that appeared in the literature review chapter is job security, which promotes loyalty to the organisation. From the responses to MGT03, it can be seen that 46 per cent of Kuwaiti firms do not offer formal job security, and their employees are unlikely to be promoted to a managerial position; however, 42 per cent say they do offer job security and their employees have the chance of achieving a managerial job.

Similar to the previous variables, the top management and leadership variable shows that K-SMMIs gave mixed responses in this respect, with some being positive and supportive of LS, and other important factors being ignored. From the total M score it can be seen that top management and leadership lie within the “Neutral” area of the scale, which is again not very supportive towards LS.
<table>
<thead>
<tr>
<th>Items</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT01</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Top management encourages and coaches workers by visiting the workplace on a regular basis.</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>MGT02</td>
<td>12</td>
<td>24</td>
<td>3</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>We locate our workers where they can use their skills, qualifications and experience.</td>
<td>14</td>
<td>28</td>
<td>9</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>MGT03</td>
<td>11</td>
<td>22</td>
<td>14</td>
<td>28</td>
<td>15</td>
</tr>
<tr>
<td>People have job security and workers are regularly promoted to managerial positions.</td>
<td>17</td>
<td>34</td>
<td>19</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>MGT04</td>
<td>The company invests in training programmes and encourages cross-job training.</td>
<td>17</td>
<td>34</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td>MGT05</td>
<td>The company uses external experts/consultants on a regular basis to evaluate the overall company performance and to improve production and quality level.</td>
<td>17</td>
<td>34</td>
<td>19</td>
<td>38</td>
</tr>
</tbody>
</table>
As mentioned above, having some positive practices in place is not enough for firms to be considered ready for LS, as most of the items in the questionnaire represent essential requirements for starting and sustaining LS. From the total M score for all variables, it can be seen that they score less than 4, which is not a great indication of LS readiness.

The following section will help to provide a firmer understanding of the firms’ readiness towards LS, by testing the hypotheses to see whether the mix of responses is subject to certain characteristics, such as ISO 9000 accreditation, ownership type, firm size or type of product produced (sector).

In order to gain a better picture another form of data collection was conducted to identify the reason behind the mixed responses obtained from the questionnaire. Part of this took the form of the observation technique, which was used to indicate whether the responses to the questionnaire are accurate, and to validate the findings.

Furthermore semi-structured interviews were conducted to help provide a better understanding from those in charge in the firms, as well as those outside, such as consultants, academics and people working in governmental institutions that are linked to Kuwaiti industries.

5.2.5 Crosstab analysis

Crosstab analysis was carried out to help obtain an understanding of the responses for two variables. The test was carried out using one statement: “Awareness about lean system”. Here, the aim was to see whether the job position, firm size, sector, ownership, ISO, and quality and management practices adopted affect firms’ awareness of LS; this was based on a Pearson’s chi-square value. The results are displayed in Table 50–Table 55.

The tables below show that ISO 9000 accreditation is the only factor that affects firms’ awareness of LS. For example, in Table 54 it can be seen that $p<0.05$ and ISO 9000 accredited firms have a better awareness than those who do not have ISO 9000 in place, while in Table 50, Table 51, Table 52, Table 53 and Table 55 the P-value is greater than 0.05, which shows that job position, sector, ownership, firm
size and quality and management practices do not have an effect on firms’ awareness of LS. This indicates that LS is not yet well known among the K-SMMIs.

Table 50 Job position vs. awareness of lean system

<table>
<thead>
<tr>
<th>Job position</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CEO/managing director</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Quality control manager</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Production manager</td>
<td>9</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Supervisor</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: $p < 0.05^*$, $p < 0.001^{**}$

Table 51 Type of product produced (sector) vs. awareness of lean system

<table>
<thead>
<tr>
<th>Type of product produced (sector)</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Sector 1</td>
<td>7</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Sector 2</td>
<td>3</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Sector 3</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Sector 4</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Sector 1: paper, paper products and printing; Sector 2: chemicals, petroleum products, coal, rubber; Sector 3: non-metallic minerals except petrol activity; Sector 4: metal product machinery and equipment activity.

$p < 0.05^*$, $p < 0.001^{**}$

Table 52 Ownership structure vs. awareness of lean system

<table>
<thead>
<tr>
<th>Ownership Structure</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>8</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Non-Family</td>
<td>6</td>
<td>13</td>
<td>19</td>
</tr>
</tbody>
</table>

Note: $p < 0.05^*$, $p < 0.001^{**}$

Table 53 Firm size vs. awareness of lean system

<table>
<thead>
<tr>
<th>Firm size</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>8</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Medium</td>
<td>6</td>
<td>21</td>
<td>27</td>
</tr>
</tbody>
</table>

Note: $p < 0.05^*$, $p < 0.001^{**}$
Table 54 ISO 9000 certification vs. awareness of lean system

<table>
<thead>
<tr>
<th>ISO 9000 Certification</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>22</td>
<td>25</td>
</tr>
</tbody>
</table>

Note: *p < 0.05, **p < 0.001

Table 55 Quality and management practices currently adopted vs. awareness of lean system

<table>
<thead>
<tr>
<th>Quality and Management Practices Currently Adopted</th>
<th>Are you aware of lean system?</th>
<th>Total</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Quality Circle</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Visual Management</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5s</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>27</td>
<td>35</td>
</tr>
</tbody>
</table>

Note: *p < 0.05, **p < 0.001

5.2.6 Testing the Hypotheses

In this research five hypotheses (H) have been developed:

- H1: There is a significant difference in the quality and management practices used by ISO 9000 firms compared to non-ISO 9000 firms in Kuwait.
- H2: Small firms and medium-sized firms in Kuwait differ significantly in terms of their quality and management practices.
- H3: Firms in different sectors in Kuwait differ significantly in terms of their quality and management practices.
- H4: There is a significant difference in the quality and management practices used by non-family-owned firms compared to family-owned firms in Kuwait.
- H5: K-SMMIs are not using quality and management practices to a very significant extent.

In the following section, the hypotheses will be tested using an independent sample t-test for H1, H2 and H4, and a one-way ANOVA test for H3. H5 will be
tested based on the overall mean score, and this will be compared to the results obtained from the 15 lean firms, and from the findings of Nordin et al. (2010).

1. Independent sample t-test

Prior to conducting the independent sample t-test it was assumed that the samples were drawn from a normally distributed population. In order to run the t-test, it was necessary to decide whether equal variance could be assumed (i.e. by testing a null hypothesis, H0). To this end, Levene’s test was carried out for the six constructs to see whether the p-value was greater or less than 0.05. The test was conducted for the ISO 9000-certified and non-ISO 9000 firms, for the small and medium-size firms, and for family- and non-family-owned firms.

For the ISO 9000-certified and non-ISO 9000 firms, Table 56 shows that the variance can be assumed equal for all factors except for suppliers, where the p-value is less than 0.05, indicating that the variances are significantly different for ISO 9000 and non-ISO 9000 firms. In this case, the null hypothesis (“There is no significant difference in the quality and management practices used by ISO 9000 firms compared to non-ISO 9000 firms in Kuwait”) cannot be rejected for processes, planning and control, customers, HR, and top management and leadership, and is rejected only for suppliers.

For small firms vs. medium-sized firms, and for family and non-family, Table 56 shows that the variance can be assumed equal for all constructs, as the p-value was greater than 0.05, indicating that there is no significant difference with respect to firm size and ownership. Thus, the null hypothesis (“There is no significance difference in the quality and management practices of small and medium-sized firms” and “There is no significant difference in the quality and management practices used by non-family-owned firms compared to family-owned firms in Kuwait”) cannot be rejected.
<table>
<thead>
<tr>
<th></th>
<th>ISO and non-ISO</th>
<th>Small and medium</th>
<th>Family and non-family</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>F</td>
</tr>
<tr>
<td><strong>Processes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>0.2</td>
<td>0.67</td>
<td>0.45</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td>0.1</td>
<td>0.79</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Planning and Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>1.1</td>
<td>0.30</td>
<td>0.34</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td>4.9</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td><strong>Customer relations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>0.0</td>
<td>0.98</td>
<td>1.0</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supplier relations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>0.1</td>
<td>0.73</td>
<td>0.21</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>0.1</td>
<td>0.78</td>
<td>0.10</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** $p < 0.05$
5.2.6.1 The effect of ISO 9000 towards LS readiness for ISO 9000-certified firms vs. non-ISO 9000-certified firms: independent sample t-test

An independent sample t-test was carried out to identify whether ISO 9000-accredited firms have better readiness with respect to LS than non-ISO 9000 firms by testing H1. The results of the independent sample t-test are shown in Table 57.
Table 57 Independent sample t-test for ISO 9000-accredited and non-ISO 9000-accredited firms

<table>
<thead>
<tr>
<th>Current Practices</th>
<th>ISO (n=25)</th>
<th>Non-ISO (n=25)</th>
<th>Entire Sample (n=50)</th>
<th>Independent Sample T-test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Processes</td>
<td>3.3</td>
<td>0.9</td>
<td>2.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Planning and control</td>
<td>3.2</td>
<td>0.9</td>
<td>2.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Customer relations</td>
<td>2.4</td>
<td>0.6</td>
<td>2.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>2.2</td>
<td>0.4</td>
<td>2.4</td>
<td>0.6</td>
</tr>
<tr>
<td>HR</td>
<td>3.2</td>
<td>0.9</td>
<td>2.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>3.6</td>
<td>0.9</td>
<td>2.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*Note: p < 0.05*, *p < 0.001**
Based on the variance results, the mean score was examined. The independent sample t-test shows that the quality and management practices within the K-SMMIs have a total mean of 2.8, which indicates that the current quality and management practices (M<4) are not very supportive towards LS.

The mean scores within the two groups were also found to be almost identical. Top management and leadership (M=3.6) was found to be the most-used practice within ISO 9000 firms, and the second most-used practice in non-ISO 9000 firms (M=2.9). The supplier relations factor was found to be the lowest in the two groups (M=2.2 in ISO-accredited firms and M=2.4 in non-ISO-accredited firms). However, the t-test results, as shown in Table 57, confirm that there is only one area that shows a significant difference between the two groups, which is top management and leadership (p<0.05).

From the 47 items tested, the ISO 9000 firms were found to have better practices in terms of providing training and involving consultants/experts to help improve firm performance only (MGT04 and MGT05), as shown in Table 58 below. This makes sense, as the ISO 9000 requirements entail that companies maintain certain standards and have a clear strategy regarding training.

Hence, H1 can only be accepted for one construct (top management and leadership), and is rejected for the remaining constructs (processes, planning and control, customer relations, supplier relations and HR). According to these results, ISO 9000 certification does not reflect heavily on the practices used within the K-SMMIs.

The motives behind adopting ISO 9000 were identified from the semi-structured interviews; in accordance with Yusof and Aspinwall (2000), it was found that many SMEs implemented ISO 9000 in order to avoid losing customer contracts, without understanding its primary purpose. According to Gotzamani and Tsotras (2001), organisations will only benefit from ISO 9000 if they implement it to improve their internal operations and quality.

This result is consistent with the literature (Carr et al., 1997; Quazi et al., 2002; Martinez-Lorente and Martinez-Costa, 2004), which suggests that there is no relation between ISO 9000 and TQM; companies who are ISO accredited do not necessarily
have a better chance of success with respect to TQM. This result is supported by Garza-Reyes et al. (2011), who pointed out that Kuwaiti manufacturing industries are aware of QI, but do not really understand its purpose, which is why it has not improved their internal operations and processes.

Table 58 Current practices for top management and leadership

<table>
<thead>
<tr>
<th>Current Practices</th>
<th>ISO (n=25)</th>
<th>Non-ISO (n=25)</th>
<th>Independent Sample T-test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>MGT01</td>
<td>4.48</td>
<td>0.50</td>
<td>4.04</td>
</tr>
<tr>
<td>MGT02</td>
<td>3.48</td>
<td>1.47</td>
<td>3.28</td>
</tr>
<tr>
<td>MGT03</td>
<td>3.40</td>
<td>1.65</td>
<td>2.80</td>
</tr>
<tr>
<td>MGT04</td>
<td>3.60</td>
<td>1.38</td>
<td>2.36</td>
</tr>
<tr>
<td>MGT05</td>
<td>2.80</td>
<td>1.60</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Note: *p < 0.05, **p < 0.001

5.2.6.2 The effect of size (small vs. medium) on LS readiness: independent sample t-test

The second independent sample t-test was carried out to test H2, in order to learn whether the difference in size (small or medium) has an effect on LS readiness. Table 59 shows the results of the independent sample t-test for K-SMMIs (large firms were excluded from this research as the study focused on the context of small and medium-sized firms only).
<table>
<thead>
<tr>
<th>Current Practices</th>
<th>Small (n=23)</th>
<th>Medium (n=27)</th>
<th>Independent Sample T-test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Processes</td>
<td>3.1</td>
<td>0.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Planning and control</td>
<td>3.1</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Customer relations</td>
<td>2.5</td>
<td>0.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>2.3</td>
<td>0.6</td>
<td>2.3</td>
</tr>
<tr>
<td>HR</td>
<td>3.1</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>3.2</td>
<td>0.9</td>
<td>3.2</td>
</tr>
</tbody>
</table>

*Note: p < 0.05 *p < 0.001**
Based on the variance results, the mean score was examined. Table 59 shows the mean and standard deviation values for each construct in terms of the two different firm sizes, along with the t-test results. When considering the mean value, it can be seen that there is barely any difference between small and medium-sized firms for any of the constructs; both small and medium-sized firms show M<4, which again shows that the current quality and management practices in both small and medium-sized firms are not supportive towards LS.

These results are consistent with those of Nordin et al. (2010), which were M<4 for non-lean firms; however, the findings contradict Mady’s (2009), which suggested that Kuwaiti medium-sized firms use quality and management practices more extensively compared to small firms. Moreover, the results show that there were no significant differences between the different-sized firms in terms of their use of quality and management practices; thus, H2 is rejected for all constructs.

2. One-way ANOVA

A test for homogeneity of variances was carried out to see whether H0 can be rejected. Table 60 shows that H0 (“Firms in different sectors in Kuwait do not differ significantly in terms of their quality and management practices”) can be rejected for supplier relations only, since this has a p-value of less than 5 per cent, and not for the remaining five constructs; this means that equal variance for all sectors is assumed for all constructs except supplier relations.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Levene Statistic</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes</td>
<td>1.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Planning and control</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Customer relations</td>
<td>1.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>8.5</td>
<td>0.0*</td>
</tr>
<tr>
<td>HR</td>
<td>2.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>0.3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Note: *p* < 0.05*
5.2.6.3 The effect of different types of firms towards LS readiness (different sectors): one-way ANOVA

A one-way ANOVA was carried out to test H3 in order to learn whether sector (product produced) has an effect on LS readiness. Table 61 shows the results of the one-way ANOVA for K-SMMIs.

Table 61 shows the M and SD values for each construct in terms of four different sectors, along with the ANOVA results. When considering the mean value for all of the six constructs, it can be seen that the values are almost identical, and there are no significant differences between the four sectors. All of the four sectors show M<4, which indicates that the current quality and management practices in all sectors are not supportive towards LS.

This result is inconsistent with Mady’s (2009), which showed that there is a difference in the quality and management practices used by different sectors in Kuwait. Furthermore, this result disagrees with Reed et al. (1996), Corbett and Rastrick (2000) and Curkovic et al. (2000), who demonstrated that different sectors have different use of quality and management practices. More importantly, it can be seen from the table below that there is no significant difference between the four different sectors in terms of their use of quality and management practices. Thus, H3 is rejected.
Table 61 One-way ANOVA test for different sectors

<table>
<thead>
<tr>
<th>Current practices</th>
<th>Sector 1 (n=16)</th>
<th>Sector 2 (n=18)</th>
<th>Sector 3 (n=9)</th>
<th>Sector 4 (n=7)</th>
<th>ANOVA Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Processes</td>
<td>3.1</td>
<td>0.8</td>
<td>2.9</td>
<td>0.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Planning and control</td>
<td>2.9</td>
<td>0.7</td>
<td>2.8</td>
<td>0.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Customer relations</td>
<td>2.5</td>
<td>0.8</td>
<td>2.4</td>
<td>0.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>2.4</td>
<td>0.7</td>
<td>2.2</td>
<td>0.5</td>
<td>2.2</td>
</tr>
<tr>
<td>HR</td>
<td>3.0</td>
<td>0.8</td>
<td>2.8</td>
<td>1.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>3.2</td>
<td>1.1</td>
<td>3.1</td>
<td>0.9</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Note: Sector 1: paper, paper products and printing; Sector 2: chemicals, petroleum products, coal, rubber; Sector 3: non-metallic minerals (except petrol activity); Sector 4: metal product machinery and equipment activity.

Note: *p< 0.05*, **p< 0.001**
5.2.6.4 The effect of different ownership types (family and non-family) on lean readiness: independent sample t-test

A third independent sample t-test was carried out to test H4, in order to learn whether the difference in ownership (family vs. non-family owned firms) has an effect on LS readiness. Table 62 shows the results of the independent sample t-test for K-SMMIs.

Based on the variance results, the mean score was examined. Table 62 shows the mean and standard deviation values for each construct in terms of the two different ownership structures, along with the t-test results. When considering the mean value, it can be seen that there are no huge differences between family-owned and non-family-owned firms for any of the constructs; both type of firms show M<4, which again indicates that the current quality and management practices in both family- and non-family-owned firms are not supportive towards LS.

These results disagree with those of Ellington et al. (1996), Levinson (1987), Ward (198), and Hofer and Charan (1984), who found that there are differences in the implementations of quality and management practices by the two type of firms, with non-family-owned organisations having a better chance of adopting quality and management practices. Moreover, the results show that there were no significant differences between the different ownership types in terms of the firms’ use of quality and management practices. Thus, H4 is rejected for all constructs.
Table 62 Independent sample t-test (family- and non-family-owned firms)

<table>
<thead>
<tr>
<th>Current Practices</th>
<th>Family (n=31)</th>
<th>Non-family (n=19)</th>
<th>Independent Sample T-test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Processes</td>
<td>3.1</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Planning and control</td>
<td>2.9</td>
<td>0.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Customer relations</td>
<td>2.5</td>
<td>0.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>2.3</td>
<td>0.5</td>
<td>2.2</td>
</tr>
<tr>
<td>HR</td>
<td>3.1</td>
<td>1.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>3.2</td>
<td>0.9</td>
<td>3.1</td>
</tr>
</tbody>
</table>

*Note: p < 0.05; *p < 0.001**
5.2.6.5 Are K-SMMIs prepared and ready for LS?

Based on mean score, H5 was tested to see whether the K-SMMIs are using quality and management practices to a very significant extent. Table 63 shows the mean score for the K-SMMIs ($M=2.8$) and the 15 lean companies ($M=4.5$), and the findings of Nordin et al. (2010) ($M=4.3$). Further, Table 64 shows the total mean for the 47 statements based on the five-point Likert scale. It is clearly noticeable that the K-SMMIs do not consider quality and management practices to be important. This means that in terms of their quality and management practices, K-SMMIs are not well prepared to implement LS. Thus, H5 is accepted.

This is consistent with Zairi (1996) and Garza-Reyes et al. (2011), who claimed that Kuwaiti industries are still in the early stages of understanding QI, and are largely unaware of QI. This also agrees with Al-khalifa and Aspinwall (2000), who suggested that the maturity level towards QI is very low in Arabic countries, and with Jaeger et al. (2013), who said that QI does not play an important role in GCC organisations. Moreover, this result proves the findings of Tannock and Ahmed (2008), who found that Arab countries have yet to feel pressure to implement QI.

In order to understand the reasons for this, and to understand the factors that affect K-SMMIs’ readiness towards LS; semi-structured interviews, observations, case studies and expert-panel interviews were conducted.
Table 63 K-SMMIs vs. lean companies

<table>
<thead>
<tr>
<th>Current Practices</th>
<th>K-SMMIs (n=50)</th>
<th>Lean Companies (n=15)</th>
<th>Nordin et al. (2010) (lean companies) (n=16)</th>
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</thead>
<tbody>
<tr>
<td>Processes</td>
<td>3.1</td>
<td>4.6</td>
<td>4.3</td>
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<tr>
<td>Planning and control</td>
<td>3.0</td>
<td>4.5</td>
<td>4.4</td>
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<tr>
<td>Customer relations</td>
<td>2.5</td>
<td>4.4</td>
<td>4.4</td>
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<tr>
<td>Supplier relations</td>
<td>2.3</td>
<td>4.4</td>
<td>4.1</td>
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<tr>
<td>HR</td>
<td>2.9</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Top management and leadership</td>
<td>3.2</td>
<td>4.4</td>
<td>--</td>
</tr>
<tr>
<td>Total mean</td>
<td>2.8</td>
<td>4.5</td>
<td>4.3</td>
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</tbody>
</table>

Note: Top management and leadership was not tested by Nordin et al. (2010)

Table 64 Total mean score for the 47 items

<table>
<thead>
<tr>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Max/Min</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item Means</td>
<td>2.84</td>
<td>1.56</td>
<td>4.26</td>
<td>2.70</td>
<td>2.73</td>
<td>0.53</td>
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</tbody>
</table>
5.2.7 Phase one concluding remarks

From the questionnaire outcome, it can be seen that quality and management practices (namely processes, planning and control, human resources, top management and leadership, customer relations, and supplier relations) within K-SMMIs are not very supportive towards LS, as can be seen from the low mean score ($M<4$) for each of the constructs. This shows that K-SMMIs lack the infrastructure and readiness for LS, and rarely use the necessary quality and management practices. In order to be ready for LS, K-SMMIs need to address many of the weaknesses that were highlighted from questionnaires.

5.3 Phase two: semi-structured interviews and structured observations

In this phase two techniques were used – semi-structured interview and structured observation – to gain a better picture and answer RQ1, RQ2, RQ3, RQ4, RQ5 and RQ6, and to triangulate the findings from the questionnaire, the interviews and the observations.

5.3.1 Interview findings

Semi-structured interviews (lasting between 30 and 45 minutes each) were conducted with 27 firm managers in Kuwait (out of the original sample of 50 K-SMMIs), to understand why LS has not been implemented in K-SMMIs, and what factors are delaying LS implementation in Kuwait from the managers’ point of view. Moreover, the interviews were used to validate the survey findings, which show that only 28 per cent of the respondents were aware of LS.

After analysing the survey results it was found that the K-SMMIs have not adopted many of the quality and management practices related to LS; further investigation was needed in order to explain this. Thus, interview questions were prepared based on the questionnaire responses, and were reviewed (i.e. pilot tested) by experts in the field from Kuwait who were involved in the subject area and were aware of Kuwaiti manufacturing sectors (consultants), as well as those who had published studies regarding Kuwaiti manufacturing sectors and quality management systems (academics from Kuwait University). The questions were modified
according to the suggestions received. The questions and responses can be summarised as follows.

**Question 1: What was the driver for adopting or choosing ISO 9000 for future implementation, and how does/will it affect your internal processes?**

The vast majority of the respondents agreed that the main purpose for adopting ISO 9000 was to expand sales and gain government contracts. According to the respondents, their main target customers are government institutions and other authorities such as oil sectors, ministries and cooperative societies. One of the interviewees stated: “ISO 9000 didn’t help us to improve internally; it was a key to gain government contracts only”.

When asked about the effect of ISO 9000 on their quality and management practices, the vast majority of respondents said it had not positively affected their quality and management practices, but that it adds more work for employees, and the only benefit of ISO 9000 has been gaining more contracts.

**Question 2: Do you feel any urgency to adopt new QI?**

Most of the answers to this question were negative. For example: “there is no real urgency as we produce simple products”; “the Kuwaiti market is very small and the competition is very low, at the moment we are doing great”; “In Kuwait you can gain government contracts without having great quality systems; all you need is links with personnel in government”.

From the interviewees’ answers, it can be seen that they feel there is no real urgency or pressure to adopt QI such as LS. This can be attributed to the low FDI in Kuwait, which equates to a lack of pressure for local firms to improve, and the lack of transparent systems in Kuwaiti government in terms of dealing with contracts and projects.

**Question 3: Do you intend to implement new QI in your firm?**

Most of the interviewees agreed that there is no real urgency to implement new QI. Moreover, they added that they deal with simple products, and feel that introducing QI could confuse and negatively affect their systems. In addition, QI requires highly skilled people, which K-SMMIs do not have at present; as one
general manager said: “New systems such as lean are useful for large companies that have complex processes but it requires very skilled workers and technology which we don’t have and can’t afford”.

**Question 4: What is your recruitment strategy?**

All the respondents stated that they do not have a clear recruitment strategy; due to budgetary constraints, they compromise the quality of their workers for lower cost. There is a lack of skilled workers in the Kuwaiti market as a whole, and industries tend to go overseas to hire. This represents a problem in that most of the shop-floor workers do not speak Arabic or English, which leads to miscommunications between workers and affects teamwork. This problem was found to be present in most of the K-SMMIs.

**Question 5: What are your rewards criteria, and are these known by workers? How often are improvement suggestions received from shop-floor workers?**

The vast majority of respondents stated that they assess firm performance as a whole, and that if they reach their sales targets they reward all workers – they do not implement individual rewards system for workers who come up with new ideas or suggestions, which is a key to improving processes. Most of the K-SMMIs do not follow a clear procedure such as conducting focus groups, or provide a clear system through which to solicit suggestions; most suggestions are informal. One manager stated:

Our workers do not have the desire to participate and provide us with suggestions, and the reason behind this is that they are working for us for short periods of time so their main concern is to make money and leave the country. Moreover, they don’t have the required skills and education; most of our workers don’t feel as though they are part of the company.

**Question 6: How do you drive continuous improvement programmes?**

Most of the firm managers seem to be ignorant about CI; some are aware of CI but state that it is too difficult to drive as it requires skilled workers who can participate in improving the current processes and identifying non-value-adding activities.
**Question 7: What is your training policy?**

The respondents perceive that training occurs via participation in workshops held by government institutions, and feel that there are no training systems within the firms, as these require financial resources. One manager said: “The government provided us with training in the past but not on a regular basis; most training programmes are for the senior level and are not related to our business”.

**Question 8: Are your workers empowered to take action when needed? Please provide an example of this.**

Most of the respondents revealed that their employees are empowered, but said that any decisions have to be approved by the top management, which contradicts the empowerment concept.

**Question 9: Please describe what teamwork and departmental relations look like at your firm.**

Most of the respondents said that it is very difficult to work as a team when the majority of workers do not speak a common language, though work between departments is relatively less problematic as it is conducted between managers. However, one manager said:

> We are striving for teamwork and work between departments, but sometimes it is too difficult due to two factors; the first is the language barrier and the second is the fact that we don’t have the technology to use between departments.

**Question 10: What are the key performance indicators for your firm?**

The vast majority of K-SMMIs do not follow specific criteria to measure their performance. This factor is very important when implementing LS, since without having a scientific method or KPIs by which to evaluate production rate, they will not be able to improve their processes or identify non-value-added activities. One of the managers stated that:

> This kind of tool requires skilled people, training and commitment and on top of that we have to be realistic; we are not dealing with complex processes so I don’t think we need KPIs to improve them.
**Question 11: How do you specify customer needs?**

Most of the managers believe they know their customers’ requirements; however, none of the interviewees mentioned that they have a specific strategy in place through which to involve their customers. One of the managers stated:

After […] many years of being in business of course we understand the customers’ requirement […] I don’t believe we need to have survey or a system […] we are the only firm that produce this products.

**Question 12: How do you deal with customer complaints?**

The responses to this question show that most of the interviewees believe customer complaints are important to them, but once again the vast majority do not have a clear system or strategy in place to deal with these complaints. Only one manager showed great maturity in this regard:

The customer is the most important factor for our business to stay alive […] we have implemented a clear strategy to collect […] customers’ complaints and […] deal with them to prevent similar mistakes from happening in future.

The same manager explained that in Kuwait, and especially in K-SMMIs, little attention is paid towards dealing with customer complaints as most firms do not feel at risk in this regard as the market is too small, and sometimes customers are forced to use the company even if they are not happy with its quality or service. The firms are driving the business rather than the customers, as the customers do not have many options.

**Question 13: To what extent are your suppliers involved in your business?**

Most of the interviewees complained about their suppliers in terms of delivery and product quality. However, none of the managers gave any indication of taking specific actions to build strong relations with suppliers. All of the managers prefer to deal with large numbers of suppliers in order to get better prices. It seems that the suppliers and firms are highly disjointed.

**Question 14: In your opinion, how effective is current government support?**
The interviewees stated that the government authorities are not serious about, and are not aware of, the industrial market, and suggested that most of their rules are made to tick boxes rather than be implemented. As one interviewee explained that the government sets many rules and regulations to organise and improve industries but they are never serious and never conduct follow up visits to see if their initiatives have been implemented or ignored by the firms. Another interviewee said: “the government has provided us with training programmes but these are never related to our business”. Thus, it appears that the government does offer help to Kuwaiti industries, but without studying their needs from a realistic point of view.

Furthermore, one manager explained that the government is one of the main hindrances for K-SMMIs with respect to improvement; he stated:

We asked the industrial authority to expand our plant as we have shortages on space and this has affected the storage of the raw materials and finished products because in the mean time we have to move our finished products to another store which is far away from our firm which is not ideal […] it takes far too long to get […] permission and only God knows when I will get it.

Another manager complement this view by saying “In order to get the approval for expansion you need to pay a bribe […] it is highly corrupted and the government is not taking any measures to deter the unethical approaches.”

5.3.2 Structured Observation

In this study, non-participant structured observation (direct observation) was adopted to allow validation of the findings. By adopting the observation technique, the researcher was able to have the opportunity to see the working areas within the firms for himself, and identify whether there are any a visual management guides in place (e.g. health and safety, designated area, inventory, etc.), and in turn make better sense of how K-SMMIs are running their businesses and eventually what sort of potential barriers are in place. For example, if there are no signs or labels for items and equipment, it is likely to contribute to delaying the process and cause wasted time; as another example, if equipment is not clean this means that the firm is not following any preventive maintenance.
In the present case, observation was used for two primary reasons: to serve the research purpose and to check the reliability and validity of the findings. This technique helped in answering the research questions (RQ1, RQ2, RQ3, RQ4, RQ5 and RQ6). The main advantage of observation is that it allows the researcher to obtain an accurate result, as the data is obtained by the researcher directly, unlike other techniques that depend on memory, such as interview. In addition, it avoids the respondent bias which can arise within a questionnaire (Zikmund et al., 2012). Moreover, observation can provide accurate information for the research. For example, in the present study used a survey questionnaire in which one of the questions asked was: “Do you have visual management practices in place?” In the questionnaire the respondents could easily have answered in the affirmative, but via observation the researcher could judge this for himself, which helped to add credibility and validity to the outcomes.

The observations were conducted after the questionnaire collected from the 50 K-SMMIs were analysed. After the questionnaire, interviews were conducted with 27 managers in K-SMMIs. During the interview sessions the managers were asked to show their working areas, as the author wanted to see for himself what these looked like. During the tour the author did not talk to anyone, since he just wanted to observe. Specific attention was paid to certain things, such as the care of the equipment, which can be observed by checking whether there is dirt on the equipment; according to Goodson (2002), this is a good indication of whether the firm is carrying out TPM or taking care of its equipment (in fact, this approach within the firm observations was inspired by Goodson (2002)).

Table 65 shows the aspects that have been observed, such as labelled items and equipment and floor; designated area for tools and equipment; condition of tools and equipment (to see whether the company cares for its equipment); VM methods (such as charts, instructions, schedules, etc.); safety environment (ventilation, health and safety clothes, etc.); process layout (flow, low amounts of WIP); storage area; workers’ uniforms; cleanliness and tidiness of the workplace, storage, etc.; suggestions system; workers’ break room (such as facilities); and records of important issues such as cycle time, lead time, etc. In other words, the aim was to identify any easily observable issues out of those that appeared in the questionnaire.
in order to better understand the K-SMMIs’ practices and to validate the outcomes from the questionnaire, while walking around the firm.

From Table 65, it can be seen that the 27 K-SMMIs visited are lacking in many aspects; in fact, as it is stands, the firms have everything that opposes the requirements of LS. From the observation, it was seen that 85 per cent of the firms do not have labels for their items, equipment and floor. In addition, 81 per cent of the firms do not have designated areas for equipment and tools, and the same percentage of firms do not care for their equipment and machines, as was observed from the dirt on the equipment, which indicates that it has not been maintained for some time.

Furthermore, 92 per cent of the firms are not using VM. Only two firms are using it. There was a clear lack of any sorts of instructions, targets, etc. in the workplace, which shows the firms’ ignorance regarding the important of displaying important information to help with smooth running of work and to avoid employees having to waste time searching for information.

With regard to the working environment, it was found that 88 per cent of the firms are ignoring this aspect. For example, it was observed that there is no proper ventilation in many of the firms, and also many hazardous materials were identified around the working area, rather than these materials being put in an isolated, secure place. This clearly shows that many of the firms are not taking this issue (the working environment) seriously considering the bad weather in Kuwait, as the temperatures can reach 52 degrees Celsius in summer, and there is often a great deal of dust and wind; it has been found that staff are working without minimal health and safety standards in place.

The firms do not seem to be trying to make the working environment more efficient or pleasant. Many authors have said that workers’ productivity is affected by the working environment; according to Haynes (2008, p. 37), “There is enough evidence to support the claim that office comfort can affect productivity”.

Based on the author’s observations, it can be said that the vast majority of firms have many issues that are affecting the process flow, including high levels of WIP and poor layout. It was found that most of the firms do not have clear standards to follow; the stages between the processes are disconnected and the production is
not based on pull. In most of the firms the products were also found to face long wait times when being moved from one stage to another, as the next stage is often not ready to receive them.

Further, during the visit identified several common factors were identified in the firms in relation to storage: raw materials and finished products were witnessed being stored outdoors, with no special care giving to them. This will affect the quality of products, as some products contain materials that require special care. Furthermore, it was observed that the storage areas were often untidy and not set in order, and there were no designated areas for finished products, so that they were mixed in together with the raw materials in most firms, which will lead to many types of wastes. Further, in some of the firms (12), it was noted that hazardous materials are stored close to other storage areas, and do not have any labels or codes to identify them. As can be seen from Table 65, only four firms have tidy and well-organised storage areas.

With regards to employee uniform, the aim was to see whether the workers had special clothes in terms of uniforms, masks, safety shoes, goggles, helmets, etc. However, it was found that only three firms are taking this issue seriously, with the remainder largely ignoring this aspect. During the visit, and from the first impressions obtained, it was noticed that most of the companies are not taking care of their employees. A special uniform will would reflect the company image; three firms did have a uniform, and these three firms were among the best among of the 27 firms in relation to many aspects.

Again, most of the companies are not taking care of the cleanliness and tidiness in the workplace and storage areas. It was found that most of the firms do not have periodic cleaning: there are materials and items all over the place, greasy floors, and dust covering the storage areas and even the equipment. This is not a good sign for implementing LS, and will also affect the workers’ morale and productivity.

As was learnt from the literature review chapter, employee involvement is crucial in the lean journey; one form of employee involvement is to have a system in place through which to collect suggestions and recommendations made by employees. During the visits the author asked whether there is a suggestion box or
any other system that allows employee to provide recommendations. Surprisingly, only two firms have a suggestion system – one if which is a suggestion box that has never been used, as evidenced by the lack of paper inside – which shows that the company is not serious about this aspect; on the other hand, one firm has a clear suggestion box that is checked on a daily basis, and many of the suggestion have been implemented and the people who made those suggestion rewarded. The remaining 25 firms seem not to believe in this system at all, as such a way in which people could provide their suggestions could not be found.

LS highly relies on people; one way of demonstrating respect for people is to provide them with good facilities and create a pleasant working environment. This in turn will be good for employee productivity. During the tour the author decided to observe the areas in which people spend their breaks, in order to see whether there are any areas for socialising, in which the workers can meet and see workers from other departments. However, this aspect was found to be unavailable in K-SMMIs: most of the firms either do not have these facilities or the break rooms are in poor condition, and there is no socialising whatsoever. Furthermore, it was learnt that the break rooms are only for the shop-floor workers so they do not mix with the firms’ top management.

Finally, during the time spent in the firms attention was paid to whether there were any records of important issues, such as visual charts or diagrams on areas including production rate, the cycle time for each product or stage, etc. Apart from two firms, none keep such records. This shows a lack of the awareness about this issue, and the fact that providing employees with information about production, defect rates, and cycle time for each product can challenge them to improve.
Table 65 Observed areas

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**Note:** × firm does not have, or keeps in very poor condition; ✓ firm has this aspect, and it is well organised; ✓ this is available, but not to a great extent.

5.3.3 Phase two concluding remarks

From the semi-structured interviews it was found that understanding and awareness of the benefits and principles of LS are very low, and knowledge of LS is missing, in K-SMMIs. Additionally, K-SMMIs are facing many issues, such as:

- Language barriers, as well as a lack of quality workers in terms of education and skills
- No empowerment or real involvement from employees
- No use of technology to communicate between departments
- No government attention towards K-SMMIs
- Low or modest knowledge of QI
- No real competitiveness or urgency to adopt QI
- No clear strategy in terms of involving employees in improving processes, or in promoting CI
- No use of scientific methods to solve problems and improve processes.

From the observation, it was learnt that most of the K-SMMIs are lacking many aspects such as labelled items and equipment and floor; designated area for tools and equipment; condition of tools and equipment (to see whether the company cares for its equipment); VM methods (such as charts, instructions, schedules, etc.); safety environment (ventilation, health and safety clothes, etc.); process layout (flow, low amounts of WIP); storage area; workers’ uniforms; cleanliness and tidiness of the workplace, storage, etc.; suggestions system; workers’ break room (such as facilities); and records of important issues such as cycle time, lead time, etc. This made it possible to make more sense of the results obtained from the questionnaire and semi-structured interviews.

These two techniques used made it possible to answer RQ1, RQ2, RQ3, RQ4, RQ5 and RQ6, and to make sense of the outcomes of phase one. Despite some positives obtained from the questionnaire, the interviews and the observations highlighted more negatives; furthermore, some of the answers given by the firms in the questionnaire were shown not to reflect reality. It was found that the vast majority of the firms are far from being LS ready.
5.4 Phase three: case studies

A field case study was then conducted by the researcher with two medium-sized firms in Kuwait. The names of the two firms will be kept anonymous for confidentiality reasons, and thus the first firm will be labelled (F1) and the second (F2).

In January 2011, 50 K-SMMIs were visited to conduct the survey to identify their level of readiness towards LS and to understand what quality and management practices are being used by them, in order to see how lean they are. During the surveys, the researcher asked the respondents if they were interested in participating further in the research study by taking part in the case study stage as a representative of K-SMMIs. An initial agreement from four firms has been obtained, however two firms withdrew for reasons such as time constraints and confidentiality. The researcher’s initial idea was to use four firms, two ISO 9000-certified firms and two non-ISO 9000-certified firms, but, due to the withdrawals, this turned out not to be possible.

Thus, multiple case studies were conducted to obtain a better picture and to see whether the findings from the survey match those obtained for the firms visited. Furthermore, this will help to validate the overall findings of the study and answer RQ1 and RQ5, as well as increasing the study’s generalisability.

The aim was to answer some questions that had arisen from the questionnaire outcomes, and to validate these. In addition, in the questionnaire the respondents were mainly those who hold a senior position, and this meant that the viewpoint of the shop-floor workers had not been accessed. The reason for this came from the initial investigation and from the pilot test; here, it was discovered that the vast majority of shop-floor workers do not speak English or Arabic, so it was so difficult and challenging to obtain their point view.

In case study F1 the author managed to overcome this problem by inviting the supervisor of this research, who can speak different languages such as Urdu, Hindi and Nepali, to attend; in F2 the researcher were escorted by the production manager, who is Indian and acted as an interpreter.
The main motive for using the case study strategy in this research was to complement and validate the main findings of the survey. The case study strategy allowed the researcher to obtain a better view and understanding of why K-SMMIs have yet to consider implementing LS; furthermore, it added validity to the findings from the survey.

The techniques used within the case study were semi-structured interviews and observations. Semi-structured interviews were conducted with selected personnel, from the top-management level to the shop-floor level, in the two K-SMMIs, which made it possible to investigate the readiness towards LS and to identify any important issues to be tackled before LS can be implemented. Furthermore, it helped in interpreting the outcomes of the questionnaire. The case study helped to identify the various forms of waste in the firms, and consider ways to reduce it.

The interviews were focused on the managements’ approach with respect to LS, as well as the general views of the key personnel and of shop-floor staff. The author wanted to obtain their opinion on issues such as how they feel about working for the firm, whether they are highly involved, whether they are aware of the company’s strategy, etc.

The author spent four days in each firm; during his time in F1 he spoke to the general manager, HR manager, quality manager, and production manager, along with 16 workers from the shop floor. In F2 he was able to speak with the general manager, HR manager, sales manager, quality manager, production manager and 11 shop-floor workers.

At the end of the four days of the case study, the outcome was shared with the general managers of the firms in the form of observations and suggestions on the various issues. In addition, a report was provided that detailed the findings, suggestions and recommendations, as well as explanations of how they can start the lean journey by adopting key tools and techniques such as 5s, VM, VSM, fishbone diagrams, TAKT time, etc., which they are not considering at the moment. The brief reports submitted to the firms will not be included in this study, as they include some confidential information and would not add any value to this research study.
5.4.1 Brief background of the case study firms

F1 is a non-family-owned firm and is ISO 9000 accredited. It produces different types of plastic bags made from three main polymers (HDPE, LDPE and LLDPE) of different grades, which are the main raw materials. These raw materials are purchased from seven different suppliers who are based in Kuwait and abroad. The customers are mainly from within the Kuwait, such as ministries, oil companies and co-ops. Product volumes are dominated by the capacity for mixing. There are some standard bags, but also many bags that are produced to customers’ specific requirements. The bags are produced through two different processes, as illustrated in Figure 21.

The current production capacity of the company has increased from 125 tonnes per month two years ago, to 200 tonnes per month. Currently, the firm is failing to reach the required productivity despite a huge investment in buying new machines and equipment.

![Figure 21 Production flow process (F1)](image)

F2 is a family-owned, ISO 9000-accredited firm. It produces a corrugated carton, of which there are two major products: standard and die cut. The firm produces a standard carton as well as customised cartons based on customer demand. Its raw materials are purchased from 11 different suppliers, all of whom are based in Kuwait. The firm’s main customers are restaurants, ministries, co-ops and oil companies.
The production capacity of the firm is 22,000 metric tonnes annually. Figure 22 shows the production flow process, which consists of seven stages. F2 is suffering from difficulties in meeting customer demand and in engaging workers to work at their maximum capacity.

![Figure 22 Production flow process (F2)](image)

### 5.4.2 Current situation for F1 and F2

This section outlines the current situation of the case studies firms, F1 and F2. It considers the view of the general managers, as well as the production process, inventory management, quality initiatives, employee empowerment, current problem-solving system, and health and safety standards.

The section below will summarise the common factors found in the two firms, neither of the firms are lean, and it was necessary to highlight the commonalties in order to generalise the findings of the case studies.

During the visits, it was found that there is huge room for improvement for both firms, as it was discovered that most of the lean waste forms seem to be present in the firms’ factories, such as unnecessary motions, overproductions, and failure to use skilled people. However, the good news is that the top management are willing to work to get rid of these wastes.

During the visits it has been found that the main pitfalls that the two firms have are:
• A lack of communication between workers and departments, as it is clearly noticeable that both firms have diversity in terms of their shop floor, where most workers do not speak a common language. Strong communication is vital for any improvement tools to be deployed.

• Health and safety issues seem not to be considered a requirement, which could have a negative impact on the workers’ performance and efficiency. In storage rooms, finished goods and raw materials are mixed together without partitions or signs. Finished goods kept for a long time in the storage areas.

• ISO 9000 standards have been introduced as a brand and image strategy for the company only, and workers in the factory do not seem to believe in them.

Furthermore, there are some issues that both firms can do little about, as they come from external factors. These include space constraints in the factories, and supplies of raw materials not arriving on time. The following section highlights the current situation and the main findings in the important areas of production and processes. Images will be included to show some of the findings, however these are all from F1 as the manager of F2 did not wish to include images of his firm despite the assurance that the researcher gave that firm will remain anonymous.

1. General managers’ view

Discussions were conducted with the general managers in both firms, in order to obtain their views on LS and why they are interested in it. F1’s manager showed great motivation towards LS, and seemed to have good knowledge about LS. However, he was concerned about the requirements and what they would need to do to adopt LS. When asked about his motives for using LS, he said:

We have made huge investments in the equipment but we haven’t been able to reach the optimum production levels and after reading many […] lean success stories we believe LS can have good impact […] however we are not […] sure if LS can be implemented in our firm as we have struggled to get our workers to digest […] ISO 9000.

From this discussion, it appears that F1 does not incorporate its people as it should, and some negative signs indications were given by the manager. For
instance: the firm does not have regular meetings or focus groups to tackle problems, and when problems occur they improvise to figure out how to solve it.

F2’s manager is interested in LS as he never believed in ISO 9000, but he only had a little knowledge of LS so the author had to explain to him what it is, how it can be achieved and what the benefits of adopting such a system are. The main problem facing F2 is its difficulty in meeting customer demand and in engaging workers to the maximum level possible.

After a thorough discussion, the general manager said:

This system [LS] […] despite all its benefits, […] wouldn’t work in our firm and I don’t think it can work in K-SMMIs […] we have far too many limitations to make it happen, such as skilled workers that we can trust, and more importantly the business environment doesn’t help.

Similarly, F2 indicated that the firm does not have regular meetings or focus groups, which will certainly limit employee effectiveness. In F2’s case the general manager is not keen on LS, unlike F1’s manager who shows a great motivation in this regard.

As highlighted previously, supplier relations are required by LS. The strategy in both F1 and F2 is to have as many suppliers as possible, so they do not have close relations with them as they believe that by expanding the number of suppliers they will be able to get a good price and faster delivery. Equally important is customer relations; both managers have been asked about their whether they have a system in place to deal with customer complaints, and whether they have a feedback system. The reply from both was negative on each count.

2. Inventory management system

Here, the aim was to learn whether the firms have proper storage system, in terms of accessibility to the needed item, storage conditions, and level of inventory, and to learn how long the items are kept in the store. An additional aim was to learn what type of inventory system the firms follow.
Both firms’ current inventory planning system is more or less based on materials requirement planning (MRP), without using MRP software. Three different levels of planning are involved:

1. Demand planning based on weekly demand: the firms plan what needs to be produced in upcoming weeks to fulfil the demand
2. Capacity planning: the firms consider the capacity available on the shop floor
3. Distribution planning: the firms decide how the products will be delivered to their customers.

Within the current situation, a simple Excel spreadsheet is used to plan. It was noted that there are high levels of inventory in both firms, including raw materials and finished products. The materials are stored in locations that are difficult to access, which will result in wasting time in terms of picking up the required items or products. Figure 23 and Figure 24 shows the storage area for F1 (no real differences were noted for F2’s case).

Both firms are clearly not producing based on customer demands, as they produce standard-sized items and keep these in stock, often before an order is received. In F1’s case the production manager declared that some items are held for more than six months. For F2, the production managers said: “we can’t wait for the order from the customer to come we need to be ready as our customers are not predictable”.

Figure 23 Raw materials and finished parts stored in a location that is difficult to access when needed
3. Facility or production layout

The production layout is a key to helping produce according to flow and minimising WIP. In this area the aim was to learn whether the firms have good processes in place that support LS. For instance, is there a clear maintenance policy to be followed? Are they working based on cell manufacturing? Are they producing based on customer demand? To do this, observations were conducted as to how the firms are laid out, and interviews conducted people at different levels within the firms.

Presently, in F1 the facilities are laid out according to the process required, from the beginning (mixing) to the end (cutting). It could be seen that from the raw materials input to final product output, there are a number of wastes in the form of motion and also large amounts of WIP, especially in the printing section. After cutting, the finished products are transported back to the store, which again entails a lengthy route. Similar machines are grouped together, which is good, but there is a bottleneck between printing and cutting. There is always some WIP inventory in the printing area.

In F2, the process starts with paper feeder and ends with end stitching. It was found that from start to end there are clear wastes: for instance, between the sheet cutter to pasting there seems to be a buffer, however when the production manager
was asked about this he replied that it is due to a lack of workers at the pasting stage. Further, in F2 it was found that the equipment is not located in sequence. In Figure 22, it can be seen the process flow, but on the shop floor it was found that the creasing machine is located before the sheet cutter, which causes waste in terms of motion.

It was further observed that the production process at both firms was hindered due to the following reasons:

- Necessary and unnecessary items mixed together in the work area;
- Tools, supplies, books and materials randomly located;
- Workplace areas untidy and disorganised;
- Minimal attention spent on overall housekeeping.
- No recording of cycle time.

Currently, the process layouts for both firms are not efficient, one and production is clearly not based on customer demand, which causes overproduction and finished products that have to be kept in storage. Further, it has been found that there is lack of information with regard to exact lead and cycle time, change-over time, and so on; however, neither production managers revealed exactly what cycle time is needed to produce particular products. Implementation of 5s is very important. F1 had begun sorting out tools (part of 5s) a couple of years ago, but he did not complete the task. As the general manager stated, “we have tried to make people digest the 5s but we failed”. 5s can be an important tool to use as a part of the lean journey or for LS implementation.

Some sort of labelling of equipment was found in both firms, but there is too much equipment in areas where it is not needed. The production manager in F2 commented that “we have to leave the equipment here because there is no room for it”. Further, the tools and equipment are not kept in specific places; most of the tools are stored in large boxes, which will cause wastes of motion if other workers want to use certain pieces of equipment, since they have to spend large amounts of time searching for it. Again, this applies in both firms.
4. Quality initiatives

Both firms are ISO 9000 accredited. The aim here was to see whether ISO 9000 has helped the firms to excel to different QIs such as LS by looking at the quality and management practices they are using; i.e. whether ISO 9000 has given them a solid foundation from which to manage their resources. Further, it was necessary to see what ISO 9000 has had on the company, and what employees think about it (i.e. whether they are fully behind it). An additional aim was to see whether employees have better working conditions following ISO implementation; to this end, several workers from different levels were interviewed.

From the respondents it was learnt that ISO 9000 has not had a great impact in terms of process improvement and quality; thus, apart from better sales and extra documentation, nothing has been gained from ISO 9000.

The firms’ quality systems and procedures are ruled by the ISO 9000 certification. ISO 9000 was introduced by F1 five years ago, and by F2 four years ago. According to the general manager, F1’s motivation to embark on ISO 9000 was a proactive move, as the company wanted to ensure the quality of their products and provide better-quality products to its customers. Moreover, it wanted to be eligible to gain contracts from the government.

In F2, meanwhile, the general manager was straightforward in saying that the firm was sure that ISO 9000 would not add value to its products, as the company has no issues with quality. However, the firm made the decision to embrace ISO 9000 on a reactive basis, as the government will not allow firms to bid on government contracts without having ISO 9000 in place.

Both managers stated that there is no customer pressure on them to implement ISO 9000; they said that the customers do not have a great deal of knowledge about ISO 9000, and that though they care about the quality of the products, ISO 9000 means nothing to them.

Despite having ISO 9000 in place in both firms, it seems that not everyone has been involved in the process of achieving this award, and the objective of the registration was not properly communicated to the all staff. It was noted that there was some resistance from the workforce in terms of the implementation of this
quality tool; for instance in F1 it was found that the production manager was highly frustrated by ISO 9000, saying that “our jobs were far better and faster before adopting the ISO standard”. The quality manager agreed with this statement. Most (75 per cent) of the respondents from F1 complained that it takes far too long to fill in the forms required by ISO 9000. According to the personnel interviewed, many are not fully behind the ISO 9000 registration. It was mentioned during the interviews that it can takes up to three hours just to document the procedures required by ISO 9000.

In F2, there was huge resistance from a senior member of staff as well: the sales manager explained that ISO 9000 had enabled the firm to gain many contracts from the government but he admitted that not everyone in the firm is happy about this as it takes them a long time to fill in the required forms. This frustration was explained by one of the shop floor workers, who said: “we could have used the time more efficiently if we hadn’t implemented the ISO standard in the mean time I have to spend two hours after work to fill in the form which is upsetting me”. The quality managers in both firms said that ISO 9000 has not improved quality, though it has certainly improved sales.

It is important that the top management communicates to all levels of its workforce the reason behind the application for ISO 9000 registration. Once the benefits of ISO are communicated, workers will soon realise that it not only involves filling in forms, but is also a tool that can reveal the hidden problems in manufacturing and maintenance. Additionally, it can help to increase customer demand, which will reflect positively on the employees’ career.

The ISO 9000 series can be used to control and direct an organisation in order to improve the effectiveness and efficiency of performance, with emphasis on continuation of improvement. To make ISO 9000 successful, it requires effort from all levels of the workforce. Therefore, it is imperative that the benefits of it are well communicated to everyone concerned. Announcing the results of ISO projects, including successes and challenges, will help future projects to avoid making similar mistakes, and to adopt best practices. Employee empowerment is an important aspect of any quality initiative, if it is to be successful.
It is also important for the company to make ISO 9000 one of its main instruments for communicating quality to its customers. It is well accepted that an organisation that has obtained ISO 9000 certification will gain competitive advantage over its non-certified competitors. It is therefore recommended that both firms display the ISO 9000 certificate in prominent locations within the company – i.e. where people can easily see it. It has to be considered a quality tool that the company has great pride in. It is envisaged that as the company grows year by year, the benefits of ISO certification will be realised in terms of increasing productivity and efficiencies.

ISO 9000 requires top management dedication and contribution in terms of resources and effort. The discussions and meetings with the top management of F1 and F2 clearly show that they are committed to this, which is an important step forward for the proposed lean journey. There is a general thought that management in both firms are trying to squeeze the workers harder by implementing the ISO 9000 standard. However, it was noticed that there is full commitment from the top management for this QI.

As was learnt from Chapter 2, LS requires buy-in from the whole organisation, and people often will not accept it unless they see real requirements to do so. From the ISO 9000 experience, it is acknowledged that the firms have not communicated its features well to the companies’ people, and have not convinced them to accept the QI; this is something they really need to overcome if they want to succeed in their journey.

5. Employee empowerment and communication

There were many aspects of concern in terms of employee communication. For instance, it was necessary to identify whether the firms have a clear policy for collecting employee suggestions, and clear awards and bonus systems, and see examples of suggestions that have been implemented by the firms. These aspects could be identified by interviewing employees from different levels, as well as seeing for ourselves how the employees submit their suggestions.

Moreover, it was necessary to know what the relationships between departments are like; i.e. whether there are conflicts, and whether every department
is aware of the other departments. Furthermore, it was important to see where people are spending their lunch breaks, and the condition of facilities offered by the companies to their employees.

When QI are introduced, people will be facing cultural changes and challenges, which they must fully understand. This requires having a clear communication plan and channels, motivating individuals, and educating senior managers, employees and customers on the benefits of quality initiatives. Communication is important, as organisational members need to communicate in order to accomplish their tasks efficiently.

During the course of the case study, it was found in both firms that there were many employees who had specific skills in quality and improvement plans. In F1, for example, the author spoke to a shop floor worker who has a great deal of knowledge about LS, but the company had not identified this and had made him responsible for filling out the required forms for IS9000, as he can speak and write English perfectly.

In F2, one of the technical workers was asked whether this is the right job for him in terms of fully utilising his skills; he replied as follows: “no I can do a much better job within other areas of the firm but the boss wants me here so I have to accept it”. As a result of a lack of meetings with shop-floor personnel, talented workers are keeping silent because there is no environment in which they can openly share their views. This untapped talent can be utilised if there is a system in place via which where people can share or contribute. This can be very helpful in problem solving. The best way to get people involved is to create and form a problem-solving group, continuous improvement group, etc.

QI such as LS cannot be successfully implemented in the absence of good communication. Communication and participation is important for LS success, since people in the company depend on one another for effective flow of information. People’s empowerment is another key to starting the lean journey. In the empowerment process, the shop floor staff should have increased decision-making authority.
In F1, there seemed to be no clear communication between departments, and it was found that there is a conflict between the sales and production departments, wherein the sales managers are pushing hard for orders, without knowing the current situation in the production department. The production manager said, “This is causing us to work extra hours and leading to stressed out workers which is not ideal”.

With regard to the suggestion criteria, the general managers were asked to show the researcher how many suggestions they had received from employees, and what the procedures are for people to make suggestions or recommendations. F1’s general manager explained that they do encourage their employees to provide new ideas; however “it is really difficult to encourage people as our workers don’t speak English or Arabic”. It was found that F1 does not keep a record of suggestions made by employees, though they do have an old, dirty box called a “suggestion box”.

In F2, the situation is similar: there is no proper suggestion programme that encourages people to participate. Both general managers were asked about bonus and rewards systems, and said that the end-of-year bonuses are based on sales only. When asked about the last bonus offered to their employees, the general manager of F1 said that it was equal to 130 GBP, while in F2 was 60 GBP.

In both firms, workers do not have a great deal of authority or empowerment; rather, the production manager makes decisions for every aspect, as explained by most shop floor workers in F1 and F2. Further, it was noted that neither firm follows a clear training strategy, and this was identified by asking both HR managers in the two firms to show the author their training records. At the end of the session, the author asked to see where the shop floor workers spend their time during breaks: in F1 it was identified that the room is not in good condition, but is dirty and untidy, with no TV or any other type of entertainment facilities; thus, people are lying down and sleeping, and no one is talking to each other, which is not a great environment to encourage people to work in. In addition, workers have to bring their own food with them as there is no canteen.

In F2 the break room is in slightly better condition than in F1, but people are still not socialising and all seem to be tired and bored. When asked about his future at F2, one shop-floor worker said: “I am only here for a few years make money then
go home […] I can’t spend my whole life in a similar position life is going and I have to move on […] I can’t see a clear organisational structure that would allow me improve my situation in this company”.

It was sensed that the shop floor workers are deflated and unmotivated, and this feeling came from the vast majority of the shop floor workers interviewed in both firms. It is believed that this aspect must be taken seriously if both firms want their employees to perform to the maximum level. Also, it is important that the roles and responsibilities of each employee, whether engineer, technician, supervisor or operator, are outlined in a clear job specification, which will help them to understand how well they have done and what they are supposed to do. As shown in the interviews, many workers do not know their responsibilities, but just wait for the production manager or supervisor to assign them with tasks; this applies to both firms.

In both cases (F1 and F2) there seems to be a distance between top management and shop-floor workers. Both firms showed that they are following a clear strategy and mission, however most of the shop-floor workers that were spoken to showed they are not aware of the company strategy: one of the employees on the shop floor in F1 was asked about what he knows about the company vision, and replied: “I don’t know in the past we used to be offered overtime which we always looked forward to but for the past two months the company has stopped the overtime […] I think the company is going bust and this is why they stopped”.

When a worker in F2 was asked the same question, he replied, “it is not my job to ask about the general strategy I come here every day to do my job then leave”.

Both general managers said that they do communicate the companies’ strategy to key personnel within the firms, but they also highlighted the difficulties in communicating with people due to the language difference. In addition, F2’s manager stated: “our workers don’t have great ideas, they are technicians and their job is to work with the machines and our job is to set the strategy”. This indicates a lack of communication, and this may be why both firms have difficulty convincing their people about the benefits of ISO 9000 adoption; as it stands LS will not be useful within such an environment.
It was realised during the case study visits that the vision, mission and strategy of both firms is not publically stated. A clear indication of where the company would like to be needs to be communicated to all stakeholders, which in turn will motivate them to achieve the firms’ vision. It is advisable for firms to organise an away vision/mission day for all staff in which the company’s vision, mission and strategy is formally outlined. An experienced consultant could be utilised to facilitate this event.

6. Problem-solving technique

In relation to problem solving, the aim was to see whether VM is being utilised in the firms in terms of recording defect rates, future plans, instructions, problem-solving techniques, charts, etc. Further, it was important to understand whether there were records of meetings held for problem solving, and what the outcomes of these meetings have been.

Currently, neither firm seems to have an established, coherent system for production or quality-related problem solving. To improve efficiency and productivity through QI, problems must be identified and taken care of. It seems that there is currently no coherent or scientific method within the firms to identify problems and tackle them using suitable tools and techniques.

In F1 there is some sort of VM, but this is mostly outdated. In both firms there was a lack of any type of VM that shows clear instructions, such as charts, targets etc. Both production managers in the two firms agreed that such tools could be a good idea, and suggested that they may consider them in future as the tools could help to improve communication. By visualising information, employees will be able to access the information they need very easily, which will help them in understanding their role without asking questions, and contribute in a positive way to the success of the company.

Moreover, comparing monthly productivity can motivate employees to achieve company targets and show them the current state vs. desired state. Many things can be added to a VM board, such as process metrics, work instructions and general plant information.
As mentioned above, neither firm has proper problem-solving or problem-identification methods in place; without problem identification, there can be no improvement. In order to be efficient, the system has to be accessible to every employee and everyone should have a chance to share their own ideas. Identification must come from numerous sources.

In addition, different methods have to be used to identify problems. Sometimes the problem just shows up, but most of the time the problem is only a quiet risk waiting for the worst moment to appear. Inspections, audits, brainstorming, Ishikawa analysis (fishbone diagram), structured interviews and semi-structured interviews with employees are all important in this regard. Using numerous sources and various methods help contribute to efficient identification of workshop needs.

By using a system of visual cues and visual communication tools that impart information at the time and place it is needed, improvements can be seen in productivity, safety, quality, on-time delivery, profits and employee morale.

VM makes the process smoother, since it saves time in identifying equipment, materials and locations; describing actions and procedures; and providing safety warnings and precaution information. Visual controls help employees avoid wasting time by giving them the information they need, where and when they need it, especially when there are language barriers.

VM is a lean technique designed so that anyone entering a workplace, even those who are unfamiliar with the detail of the processes, can very rapidly see what is going on, understand it, and see what is under control and what is not. Essentially, the current status of the operation can be assessed at a glance. More importantly, it will make problems more visible.

7. Health and safety

This area addressed the working conditions within the firms, in terms of employee clothes, safety shoes, mask and goggles, which is especially important in this type of industry as it deals with hazardous materials. Increasing safety for workers, diminishing the number of accidents, and protecting the environment is of paramount importance to any company.
F1 and F2 have limited space, and are currently operating under the tight available space in closed buildings. In F1, it was noted that there is no ventilation system in the working area, despite it being a critical aspect, since the odour of printing materials is hazardous to the health of employees, especially those in the production line. Therefore, F1 should take address this problem by installing vacuum suction equipment. In addition, a proper air conditioner or efficient fans in the production line area would certainly enhance the production efficiency and comfort of the work force.

F2, on the other hand, keep some hazardous material near the storage area. In terms of uniforms and safety products for employees, both firms are lacking; for example people working in the printing section in F1 do not wear masks. People on the shop floor production line were also noted to be wearing slippers. Thus, there is clearly a lack of awareness towards health and safety issues from both firms, which needs to be considered. Figure 25 show some pictures taken from F1.

Figure 25 Flammable liquids stored within a closed storage area for raw and finished materials

It was found that both firms are lacking in the following areas:

- Display of health and safety charts/posters;
- Poor condition of staff break rooms;
- Unclean and messy working areas;
- No use of safety goggles, gloves or masks;
- Flammable liquids and hazardous materials not stored in separate designated area.

In order to increase safety for workers, the above issues need to be considered by both firms. Implementing measures to overcome them should lead to an increase in staff confidence in the firm, and eventually to increased efficiency and productivity.

5.4.3 Phase three concluding remarks

These case studies investigated the readiness towards LS at F1 and F2. The case study results show that both firms currently have many forms of lean wastes, such as over-production, high inventory levels, high waiting time, unnecessary transportation, lack of use of skilled people, and unnecessary motion.

Table 66 shows the areas observed during the visits. It shows that both firms are lacking in, and ignoring, many aspects that are required by LS, which will affect the smooth running of their businesses and contribute to creating wastes.
Table 66 Observed areas in F1 and F2

<table>
<thead>
<tr>
<th>Observed area</th>
<th>Firm</th>
</tr>
</thead>
</table>
| Labelled items, equipment and floor                   | ×    | √*
| Designated area for tools and equipment                | ×    | ×   |
| Condition of tools and equipment (maintenance)        | √*   | √   |
| VM (charts, instructions, schedules, etc.)            | ×    | ×   |
| Safety environment (ventilation, health and safety clothes, etc.) | ×    | ×   |
| Process layout (flow, low WIP, etc.)                  | ×    | ×   |
| Storage area                                          | ×    | ×   |
| Workers’ uniforms                                     | ×    | ×   |
| Cleanness and tidiness (workplace, storage, etc.)     | ×    | ×   |
| Suggestions system                                    | √*   | ×   |
| Workers’ break room (facilities)                      | ×    | ×   |
| Records of important issues (cycle time, lead time, etc.) | ×    | ×   |

**Note:** × Firm does not have, or has but keeps in very bad condition; √ Firm has and keeps well organised; √* Available but not to a great extent
The case study observation and findings also suggest that there is a great potential for LS to be implemented in F1 and F2, and it is highly likely to help both firms to eradicate all type of wastes and improve their production rates. However, the organisational culture in both firms is currently unsuitable for LS: shifting to LS requires a structure that comprises strategic vision of management, leadership commitment and skilled people. Further, the firms need to use funding for training purposes and expertise, as well as improving in relation to their organisational culture and empowerment of employees.

F1’s manager showed an interest in going further with this, and stated that he will consider implementing LS in the future; in F2 the scenario is slightly different, as the general manager shows less desire to adopt LS as he believes it will not work within the Kuwaiti context, considering the requirements of LS.

Based on the visits, several tools and techniques within LS would help both firms to move forward in their production. For example, they should adopt 5s, VM, PDCA cycles, fishbone diagrams, and TAKT time. These tools and techniques would help both firms to eradicate many wastes. The case study gives a better picture about K-SMMIs’ readiness towards LS, and helps to reveal the outcomes obtained from the questionnaires, observations and the semi-structured interviews. The case study also helps to answer the RQ1 and RQ5: it was found that both firms are far from being LS ready, and their awareness of LS is modest. This supports the findings from phase 1 and phase 2.

Further records of important events and sharing this with other members staff or teams is vital. Quality circles (QCs) should be formed, and the team leaders could initiate these in both firms, and must make sure that all workers have access to all required information.

5.5 Phase four: Expert panel

After collecting and analysing the data from the questionnaires, interviews, observations and case studies, an expert panel was approached, including a quality management practitioner, academic staff from Kuwait University who are teaching lean and quality management subjects and have published papers relating to quality
management within the Kuwaiti context, ISO and quality management consultants, and finally people from government institutions who are directly involved in Kuwaiti industry and are aware of the relevant policies. Semi-structured interviews were conducted with the experts (lasting between one and three hours).

The reason behind using an expert panel’s opinion and knowledge is to add trustworthiness to the findings of the research, which will enhance the robustness of the outcomes as well as guiding the researcher’s perspective. Furthermore, it will help to answer RQ1, RQ2, RQ3, RQ4, RQ5, and RQ6, and unveil hidden areas that could not be addressed in the previous phases.

The experts were divided into two groups. The first included people from the government institution (14 persons), and will be referred to as (EXP1); the second included experts from Kuwait University and consultants (12 persons), and will be referred to as (EXP2). The participants were assured that their names would remain totally anonymous. The first question was created to identify the experts’ opinion of the performance of K-SMMIs.

Question 1: How would you value the current contribution of K-SMMIs towards Kuwaiti economy?

Most of the respondents agreed that K-SMMIs are making no real contribution or impact towards the economy. According to the respondents, K-SMMIs do not play much of a role in this regard at all. One of the participants from EXP1 stated: “we are planning to engage the K-SMMIs to enhance their role but it is still early to talk about their impact”.

Question 2: During our visit to 50 K-SMMIs, we did not see a great deal of quality practices. What are your thoughts on this?

The vast majority of respondents were not surprised about this; the general thought about the lack of quality practices in K-SMMIs is that they lack knowhow and feel there is no real need to adopt QI. According to one EXP1 “we have encouraged […] firms to adopt QIs such as ISO 9000 but they are too slow to go for it”. One EXP2 stated “there is nothing to force [firms] to adopt QI, their main concern [is] to make the business go forward and they have that without real QI”. Another EXP2 stated:
Kuwaiti industries are concentrating on generating profit for one main reason which is the lack of competitors in the market […] in Kuwait there is no real pressure from other industries as there is [a] very small number of foreign industries and this has resulted in their ignoring the QI […] if you don’t feel pressure you don’t have to develop […] quality is the last thing to consider when producing a product or service as far as the Kuwaiti market is concerned.

Another EXP2 pointed out that, “[firms] can gain governmental contracts and projects based on their links not their quality system”. Most of EXP1 believe that despite all the drawbacks of the working environment in Kuwait, firms can still improve; however, they are not considering these issues as they are not ambitious enough.

**Question 3: What are the barriers that are preventing the K-SMMIs from adopting LS?**

According to the respondents from EXP1 and EXP2, there are many aspects that are preventing K-SMMIs from being world-class firms. However, all experts agreed on the following points:

- The lack of skilled workers in K-SMMIs
- The lack of knowhow about implementing LS
- The lack of leadership to drive the required changes
- The lack of top-management commitment
- The lack of quality culture.

One EXP2 stated: “in [K-SMMIs] there is a missing link between top management and shop floor people, which is not useful for LS”.

One EXP1 stated:

The K-SMMIs are receiving a lot of support from the government and they [take] it for granted […] they receive cheap electricity, water, fuel and even […] training […] they don’t want to go for LS to cut out a few steps in their process or to save electricity bills or to save energy, those things don’t seem to be a problem for them […] their main concern is making a profit and they are making one, so why would they turn their attention to difficult and complicated QI.
Question 4: Based on our analysis we could not see any differences between ISO 9000- and non-ISO 9000-accredited firms. Could you explain why? (Only answered by EXP2 group)

One EXP2 said, “you are absolutely right, firms are opting to go for ISO 9000 for only one reason: to expand their sales […] by being ISO 9000 [accredited] firms can […] bid for many governmental projects”. Another EXP2 stated:

ISO 9000 is a big problem in Kuwait, as it has been run by many corrupted companies […] in Kuwait you can easily get an ISO 9000 certificate without changing anything in your process, any company in Kuwait can purchase the ISO certificate from one of the ISO agents and the company doesn’t have to worry about the [application process] as the agents can arrange it with an auditing agent they know personally […] it’s corrupted [and] this is why you can’t see a great impact from ISO accreditation.

Another EXP2 said:

Many companies [in Kuwait] nowadays are going for ISO 9000 but they still lack key ingredients such as […] buy-in from the top management and from shop floor alike […] when we visited many companies for ISO 9000 implementation we found that the top management are not serious and not committed and just wanted the ISO certificate as soon as possible.

Most of the respondent concluded that ISO in Kuwait is a branding tool, not a quality tool. As one EXP2 said “lately the government has forced […] industries to have ISO certification so they bought the certificate only without gaining the benefit from the certificate in terms of improving the quality of their product”.

Question 5: We did not come across any Kuwaiti workers within K-SMMIs during our visits. Could you explain the reason for this?

Most of the respondents agreed that most Kuwaiti people prefer to work within government sectors, where there is a minimum workload, security, and good wages. According to one respondent from EXP1, the Kuwaiti government is lacking in terms of strategic thinking; it spends a huge amount of money on education by sending students to different universities in the UK and the US, without studying the market needs. He added, “There is no great incentive to work within K-SMMIs as
these sectors are highly neglected by the government and we are doing our best to make it attractive”. Another person from EXP2 highly attributed this issue to the mentality of Kuwaiti people, stating that:

Kuwaiti people are lazy and not willing to use the qualifications that they have gained from western universities. They want to work in governmental jobs so they can build relationships and use them for their own benefit.

**Question 6: Does the national culture prevent K-SMMIs from adopting LS?**

Most of the respondents from EXP1 and EXP2 agreed that the national culture is one of the most vital aspects inhibiting the adoption of LS. As EXP2 explained:

Let me put it this way, Kuwait […] highly values nepotism and favouritism. Why would the firms go for LS which may cost them a lot and may not work well, when they have […] contacts with key people and relatives in the government who can help them in selling their products without having great quality systems in place.

Another EXP2 stated:

The Kuwaiti culture promotes laziness and not working hard because you will always find someone to help you, plus we always believe that the future is in God’s hand, and that's why in K-SMMIs’ minds they […] won’t be able to sell their products even if they adopted all of the QIs if it against […] God’s wish and they will make money and sell all their products if […] God wants them to, even if their products are not high quality.

The experts explained that LS requires delegation, empowerment and participation. In Kuwait there is huge respect for managers, and workers always try to make managers happy. In addition, managers are not willing to delegate responsibilities to others.

Another EXP2 said:

If we want to know why the K-SMMIs are far away from lean we need to study the Kuwait organisational culture and national cultures, foreign investment, corruption and transparency so we can know why we are behind as far as LS is concerned […] By knowing those things the fact that Kuwaiti SMMIs are far from LS would make sense […] As the main concern in K-SMMIs is to have links with government so
they can provide them with the service and product […] once you have links you don’t need to have LS.

**Question 7: What is your opinion about the quality of labour within K-SMMIs, and does it affect the K-SMMIs in terms of adopting LS?**

There was general agreement among most of the respondents that in Kuwait, and especially in K-SMMIs, there is no skilful labour, as most of the firms are not producing complicated products. The experts believe that the quality of labour in Kuwait is delaying the implementation of LS, as LS requires skilled workers to implement, sustain and participate in improvement every day. One EXP1 said: “K-SMMIs are opting for cheap labour as they want to keep the cost down […] with low quality labour your business can’t improve so this is surely affecting the adoption of LS”.

Another EXP2 explained that:

> Skilful labour is always good for any business however the K-SMMIs are not doing enough, there is no harm in keeping the cost down and recruiting cheap labour but the K-SMMIs have to invest in training to improve the capabilities of their workers, but this is not happening.

Another EXP2 said:

> LS encourages […] empowerment and employee involvement. In the Kuwaiti case this is very difficult as they are [relying] on low-quality labour and you can’t empower people if they have nothing to offer and you can’t expect low-skilled people to drive the business forward.

Again, most of the respondents believe that because of the lack of skilled labour the top management cannot communicate their vision and strategy to their employees; this in turn results in a huge gap between top management and shop-floor people.

One EXP1 explained that it is the top management’s fault that they are not recruiting highly skilled people, and now the government are considering issuing a rule that will force industries to recruit people who can speak English, as most labourers do not speak English or Arabic, which is almost certainly affecting the industries’ performance.
Another EXP2 said:

[Non-Kuwaiti] labourers are not highly motivated because their wages are very low compared with Kuwaiti people. I have found that there is a gap between Kuwaiti people who are satisfied and saturated [in terms of wages] and foreigners or labourers who are discontented [since they get paid far less compared with Kuwaitis], so there is injustice that affects the motivation negatively.

**Question 8:** How many K-SMMIs have asked for your consultancy with regard to LS or QI implementation in recent years, and what was this consultancy specifically for?

Most of the respondents declared that the K-SMMIs are ignorant about QI, and that LS is barely known by those industries. QI can only be found in large industries, where they are not adopted by choice, as most of these companies have partnerships with foreign firms that force them to adopt QIs such as ISO 9000, six sigma and TQM. According to the respondents, LS is not well known even in large industries in Kuwait.

Another reason for the K-SMMIs’ failure to take advantage of consultancy is the related charges, which K-SMMIs cannot afford. According to one EXP2, “Kuwaiti organisations in general are not serious when they consult with experts; this is exactly what Tony Blair’s study shows, they paid him for his consultancy but it was kept in a drawer, nothing has been implemented yet”.

**Question 9:** During our site visits to K-SMMIs, we found that many firms are not taking care of their premises in terms of storages or health and safety (e.g. no ventilation and no work shoes). As a governmental institution, do you conduct periodic visits to K-SMMIs, and do you issue fines to firms that are not following industrial rules? (Only for EXP1 group)

Most of the respondents agreed that they do not conduct periodic visits, and stated that they barely ever issue fines. They are fully aware that firms are breaking the rules, but they can do little about it. As one EXP1 said:
I have got to be honest with you, our institution is like many other governmental institutions, we set the rules but we never follow up as many times we have issued a fine then […] discovered that the firm didn’t pay because they know people in higher positions who have helped them to drop the fine […] and this has lead our employees to feel that there is no need to make an effort and conduct visits if nobody will respect them.

Another EXP1 said:

Managers are greedy. They only think about making money, not about creating the right environment for their employees, and because most labourers are coming from poor countries they don’t complain and just accept the situation […] most importantly [labourers] are not fully aware of their job description and their rights.

Furthermore, one EXP1 admitted that:

Most of the firms are working in small spaces; they don’t have spacious storage rooms so they cannot arrange them and make them tidy and we as governmental institutions […] have to […] make it easy for […] firms to expand, but due the lengthy procedures, expansion could take many months or years to be approved, and this is not in our control.

**Question 10: Are you satisfied with your role in developing the manufacturing sectors? (Only for EXP1 group)**

The respondents agreed that there is always room for improvement, and pointed out that though the government has offered the manufacturing sector a number of privileges, the managers of firms are not doing their best to improve. However, one of the experts explained that there are many flaws in government offerings, which have resulted in many firms immigrating to Saudi Arabia, which offers a better business environment for them.

According to another expert, “the government are spending heavily to develop this sector but not according to a proper plan […] Kuwait can create good manufacturing industries as money is not an issue; the issue is how to manage the resources and this is a mutual responsibility for the government and the business owner alike”.

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Question 11: During our visit we heard many stories regarding the disjointed policies set forth by governmental institutions. Do you agree with this?

Most of the respondents agreed with this and attributed it to a lack of coordination between the different government institutions. One EXP1 said that it “happens because there are many conflicts of interest, like for example one day you find certain governmental institutions issue a rule, and on an other day you find other governmental institutions issue different rules that contradict each other, and that is because […] the governmental institutions are run by merchants”.

Further, many of the experts said that this conflict and contradiction in rules is adversely affecting the manufacturing sectors; they attributed this to the fact that some governmental institutions set rules based on merchants’ interests, which has prevented FDI from coming to Kuwait, and when there is no FDI, there cannot be a highly competitive market.

One EXP1 said:

I agree with you there are many disjointed policies and I can tell you the reason why […] there are some key positions held by incompetent people […] I worked in one of the governmental institutions and I saw myself people who are working on the industrial cases but have no qualifications regarding the manufacturing industries, and yet they made crucial decisions.

Question 12: As you know, LS requires strong relations with suppliers and customers. Do you think K-SMMIs have the potential to create these relations?

Many of the respondents said that it is too difficult for K-SMMIs to build these kinds of relations. In terms of suppliers, they believe that in Kuwait there are no quality suppliers in terms of delivery and quality; in addition, they said that these suppliers are just like K-SMMIs – i.e. not highly educated and lacking awareness of many aspects required by LS. In terms of customers, the respondents said that K-SMMIs are mainly from governmental sectors and co-ops; in terms of governmental sectors firms do not have to have great quality as they can easily snatch deals based on links, and in terms of customers there is a lack of understanding about quality. Customers do not care about having ISO 9000-certified products if it increases the price; they rather go for lower quality for a better price.
One EXP2 stated:

The customer and supplier relations in Kuwait are not at a mature stage […] you wouldn’t find any K-SMMIs conducting surveys with customers and you wouldn’t see supplier involvement, which are essential for LS but unfortunately firms don’t see this.

**Question 13: Can you describe the ability of top management and leaders in K-SMMIs? Do you think they have what it takes to adopt LS and be successful?**

Once again, most of the respondents suggested that K-SMMIs are lacking in these aspects. They agreed that LS requires huge attention from top management, as well as strong leadership, however these factors cannot be seen in K-SMMIs. In Kuwaiti large industries there is good management and leadership, as their recruitment systems, as well as links with Western companies, forces them to have these factors in place.

One EXP2 stated:

It’s difficult to find [top management commitment and leadership] within K-SMMIs […] they rely on one key player to drive the business and don’t encourage other workers to participate […] I had met many of the workers in those industries and I asked them about the company direction; apart from some key personnel in the company none of the shop floor workers answered me and that shows that in Kuwait we don’t have the maturity to deal with employees and demonstrate the weaknesses of the management and leadership.

Another EXP2 said:

You would be surprised if you found a quality culture in K-SMMIs. You won’t find top management delegating authority and responsibility […] you won’t find huge commitment from top management and you won’t find leadership that creates a quality culture.

Another EXP2 said:

People are the driver for any business; you have to understand the employees’ needs and create an environment where they can perform and use their skills at the maximum level […] that is not happening in Kuwait. Take a tour in K-SMMIs and
you will find people are not happy and many of them are assigned to jobs that don’t use their skills.

One EXP1 stated:

Top management don’t like to invest in training their people and workers. They don’t like to read and they don’t like to be involved. They may invest in consultancy programmes but they stay out of it and don’t get their hands dirty […] Plus they don’t have […] strategic thinking ability, they are only concerned about short term plans […] Kuwaiti leaders are not leading by example; they don’t even understand the value of the company and how things work or should work.

Other pitfalls were explained by an EXP2:

Managers only adapt systems that allow them to sell, so their main concentration is external and they are ignoring the internal factor and respect for people, they follow the show off principle […] Empowerment is not in place as managers in Kuwait like to have the initial and final say on every aspect and the people only obey this and don’t have opinion.

Question 14: During our visit to the K-SMMIs’ shop floors we were unable to find any visual management techniques, such as designated areas for keeping items and equipment. In fact, we found the workplace to be untidy. How would you explain this?

Most of the respondents believe that VM techniques require huge amounts of effort and knowledge that are not available in K-SMMIs, as many do not consider these issues important. One EXP2 said:

K-SMMIs don’t care about the working area; they don’t see keeping the workplace tidy or using visual management as a factor to create a better environment […] basically once the orders arrive from the sales department the production line have to respond to them even if they have to work extra time […] K-SMMIs don’t have the mentality of taking precautions […] they would rather leave the situation as it is and if they need to work harder they have no problem, as their workers will never complain about getting overtime.

One EXP1 stated that:
These things don’t represent problems to K-SMMIs, considering the low skill levels of employees and the uncomplicated products they produce […] they believe having charts, results, etc. […] won’t have a positive impact […] I would say they are ignorant.

**Question 15: How would you describe K-SMMIs’ opinions on the importance of training?**

The respondents explained that most of the K-SMMIs do not follow a clear training policy because they do not know what they want from it. As one EXP2 said: “the main concern of […] K-SMMIs is to have training certificates, not to develop”. The experts explained that small and medium-sized companies always face a limited budget, which is why they do not invest in training; firms who do provide training often do it for the sake of ISO 9000 requirements, rather than to meet a real need.

**Question 16: As it stands, do you think K-SMMIs have the right foundations and the potential to adopt LS?**

Most of the answers to this question were “no”, but the experts agreed that K-SMMIs could have potential if they are able to deal with the inhibitors that surround the manufacturing sectors. According to the respondents, in Kuwait there are many internal and external obstacles that prevent K-SMMIs from considering LS in their firms. One EXP1 stated:

In order to achieve world-class firms, the Kuwaiti government must create a sense of urgency and make the firms improve, and that won’t happen unless there is a transparency from the government in terms of accepting deals and projects. If they can do that the firms will be forced to implement LS and other QI to improve […] in the mean time the firms don’t feel any pressure to improve.

EXP2 added:

The firms’ management has to change; they must understand the potential that LS can give to their company […] the recruiting policy has to change so that they recruit highly qualified people […] the business environment has to change to be more competitive so the companies […] feel the pressure and improve to survive […] as it stands this is not available in Kuwait.

Furthermore, another EXP2 added:
K-SMMIs are run by people who are not ambitious enough […] let me give an example: can you run 10,000 meters after eating a heavy meal? […] This is the case in K-SMMIs; the management are satisfied and full, they can’t move and they don’t think outside the box because they don’t need to as there is no real urgency or pressure […] pressure can be created by the government but they don’t want to as they are not serious about this sector.

The respondents explained that the change has to come from within the organisations by enhancing awareness in order to be ready for changes; at the moment, the vast majority of organisations are far from being ready to follow what other organisations around the world have achieved. The top management have to have buy-in, show real commitment, and lead by example; there is a need to implement intensive leadership training so they can convince their people of the merit of their ideas.

Furthermore, one EXP2 explained that if top management asks for help from consultants they must participate in the programme themselves, discuss it with their people and show them why they are trying to implement such a system, as well as what benefits they are trying to achieve. They also need to have good measurement systems in place so they can assess their progress and modify it, then sustain it and make it their way of life; they will only achieve this if they develop their human capital, create a better working environment and involve employees in formulating the organisation’s strategy. However, many Kuwaiti organisations – not only K-SMMIs – are currently lacking key aspects; they do not have a quality culture in place.

Confidence levels in K-SMMIs’ managers and workers are very low; K-SMMIs’ managers do not like to be innovative and use initiative, and instead prefer to follow others in terms of their successes. For example, most companies that have adopted ISO have done so based on external motives – i.e. to improve sales – but have not changed their internal processes. EXP2 suggested that this is a critical issue, since ignoring the internal aspect will not lead an organisation to long-term success, whereas changing the internal factors will lead to external success by default. Other EXP1s believe that most of the K-SMMIs are not yet ready for change; their main concern is not to sustain the business in the long term, but rather strive to generate instant profit.
5.5.1 Phase four concluding remarks

Meeting with the expert panel yielded a more thorough understanding of the K-SMMIs, as well as the factors that are affecting or delaying their introduction of LS, which are external factors as well as internal.

The external factors arise from corruption in dealing with governmental projects and contracts, as well as corruption from the ISO agents, who can easily offer the ISO certificate without forcing firms to actually make the required internal changes. Firms can go and buy a certificate just to show to customers that they are ISO accredited. Furthermore, because of nepotism and favouritism, firms can gain more projects regardless of their quality; this is in line with several researchers (e.g., Al-Kazemi and Ali, 2002; Harry, 2007; Blair, 2009; Kinninmont, 2012) who claimed that the corruption level is very high in Kuwait. The experts also emphasised that there is no real urgency for firms to go beyond ISO, and no real competition in the Kuwaiti market. Furthermore, they highlighted the lack of attention from the government, as the Kuwaiti government does not see this sector as contributing to the economy due to the country’s high dependency on oil.

The experts further explained that the firms themselves have huge responsibilities to educate themselves, since, as it stands, most firms are relying on government support. They are lacking the necessary leadership and commitment from top management, as well as knowhow with respect to using and adopting QI such as LS. They need to take things seriously, and must pay attention to involving their employees and delegating responsibilities, as well as implementing training systems. They also need to mature in terms of building relations with suppliers and customers.

Finally, the experts concluded that K-SMMIs are not ready to adopt LS, but emphasised that there is huge potential for them in this area, though this potential is conditional on the creation of urgency from the government, as well as transparency in terms of offering projects to qualifying firms regardless of links. Further, the government needs to monitor the ISO agents to make sure they are working in a clear way.
5.6 Chapter summary

This section explained how the results were obtained through the four phases, and from different sources, and discussed the data collected from the respondents in Kuwait. The techniques used for the data gathering included questionnaires (first phase), semi-structured interviews with 27 managers in K-SMMIs, and observation of the same 27 K-SMMIs (second phase), two case studies (third phase) and finally interviews with an expert panel (fourth phase).

These techniques helped to answer the research questions and test the hypotheses. The results show that K-SMMIs are not currently ready, and do not have the right foundation, to start LS. Several issues need to be addressed, some of which lie within the organisation and others outside it.

It was found that the K-SMMIs are lacking many of the requirements for LS, as identified from an intensive data analysis, interviews with different personnel, and observations, which made it possible to obtain an understanding of the current situation within the K-SMMIs and to see how far they are from LS, and to understand the reasons that are impeding the K-SMMIs from competing with world-class industries.

Figure 26 shows the main aspects that are affecting the K-SMMIs with respect to the six constructs used to measure firms’ readiness towards LS, including: processes; planning and control; human resources; top management and leadership; customer relations; and supplier relations. The results show that these factors within the firms are far from being lean, and there are too many inhibiting factors, as can be seen from Figure 21.

The following chapters will discuss the results to complete the final picture of K-SMMIs, and to see whether the findings of this research study support or disapprove those of other researchers.
Factors affecting K-SMMIs' readiness towards LS

- Suppliers are lacking quality
- Shop-floor people are isolated from top management
- Management style is not supportive
- No strong relations with suppliers
- Ignorance about important factors for LS
- Organisational culture is lacking quality
- Lack of leadership
- Departments within the firms are isolated, with no clear communication
- No support from government
- No technology to organise the work within the firms
- No strong relations with customers
- Lack of knowhow on LS
- No skilled workers
- National culture is not supportive
- Lack of quality workers in terms of education and skills
- No real urgency or pressure to adopt LS
- No commitment to training
- Language barrier (most of the workers don’t speak a common language)

Figure 26 Factors affecting K-SMMIs' readiness towards LS
Chapter Six  Discussion

6.1 Introduction

In this chapter, the research findings from the questionnaires, semi-structured interviews (with 27 K-SMMI managers), observations (27 K-SMMIs), case study, and expert interviews will be discussed. After reviewing a great deal of literature, six RQs and five hypotheses have been developed to derive an understanding of the situation within K-SMMIs regarding their readiness and preparedness with respect to LS. Several techniques for data collection were adopted to help answer the RQs and hypotheses.

6.2 Discussion of the findings

Several issues were identified from the reviewed literature; this chapter will consider whether the findings are in agreement with the findings from other researchers.

In the first phase, the data collected from the survey questionnaire indicates that quality and management practices (namely processes; planning and control; human resources; top management and leadership; customer relations; and supplier relations) within K-SMMIs are not very supportive towards LS, as can be seen from the low mean score (M<4) for each of the constructs. This shows that K-SMMIs lack the infrastructure and readiness for LS, and rarely use quality and management practices. Thus, the research moved on to phases 2, 3 and 4 to understand why the K-SMMIs do not have the right infrastructure for LS.

Many factors affecting the implementation of quality and management practices in K-SMMIs have been revealed in this study. The semi-structured interviews with the 27 managers in K-SMMIs revealed factors including language barriers, as well as a lack of quality workers in terms of education and skills, technology, government attention towards K-SMMIs, knowledge of QI, competitiveness and urgency to adopt QI.
A lack of skilled workers, language barriers, and a lack of technology were the dominant factors highlighted in the interviews, since these factors affect the firms’ ability to create a quality culture due to the constraints they place on teamwork and effective communication. Moreover, it was found that the firms do not follow a clear strategy in terms of involving employees in improving processes, nor in promoting CI.

It was found that there is no real pressure or urgency to adopt LS within the K-SMMIs due to the small size of the market and a lack of competitiveness; this is consistent with Tannock and Ahmed’s (2008) findings, and also supports other findings (e.g. Nordin et al. 2012; Stone, 2012; Abrahamsson and Isaksson, 2012) that urgency is what stimulates organisations to pursue LS.

Toyota itself invented TPS due to urgency; according to Hines et al. (2004), TPS was invented due to a scarcity and shortage of resources and the intense competition in the Japanese market, which equated to a pressure and urgency for Toyota to create a new system within its business.

Likewise, the Lean Enterprise Institute (2005) and Mersha (1997) have claimed that companies around the world adopt LS/QI if there is urgency and competitiveness in the market. Moreover, the business conditions in Kuwait have been found to be unsupportive for K-SMMIs to implement LS; according to Cooney (2002), LS has had limited success globally, as it is highly dependent on business conditions that are not always available. This could be one of the main reasons why K-SMMIs have not yet considered LS, and is understandable as the reviewed literature shows that Kuwait is heavily focusing on producing oil, which has resulted in other sectors being ignored (Harry, 2007; Kinninmont, 2012).

The lack of readiness towards LS was also revealed from the structured observations conducted in 27 K-SMMIs, where an even worse picture was found with respect to LS readiness. Most of the firms do not have good practices in place, and too many issues have been ignored, such as labelling items, equipment and floor, providing designated areas for tools and equipment, ensuring the condition of tools and equipment is good (i.e. caring about their equipment), using VM methods (such as charts, instructions, schedules, etc.), providing a safe working environment (ventilation, health and safety clothes etc.), using a process layout (with good flow,
low WIP, etc.), providing storage areas and workers’ uniforms, keeping the workplace, storage areas, etc., clean and tidy, implementing suggestions systems, providing workers’ break rooms, and keeping records of important issues, such as cycle time, lead time, etc. The structured observations led to a better understanding of the outcomes from the questionnaires and the semi-structured interviews.

Furthermore, the case study gave an even clearer picture with respect to what is going on within K-SMMIs; it has been found that shop-floor workers are generally ignored by the top management; in addition, no real contribution is forthcoming from them, for reasons such as a lack of quality in terms of the workers themselves, language barriers, and the fact that top management are not trying get workers involved.

Furthermore, the case studies show that top management are not involving people as they should, and this was manifest in the fact that many workers within the firms do not agree with or believe in ISO 9000, but have been forced to accept it by top management. This was also shown in the semi-structured interviews with the 27 managers of K-SMMIs.

The expert panel revealed many factors that are delaying the use of LS within K-SMMIs. Some of these are internal, and thus relate to the firms themselves, while others are external. Some of the external factors that were revealed by the experts include corruption in dealing with government projects and contracts, as well as corruption from ISO agents, who can easily offer the ISO certificate without ensuring internal changes have been made. Firms can go and buy an ISO certificate just to show customers (which are mainly the government) that they are ISO accredited. These findings are in agreement with those of other researchers (e.g., Al-Kazemi and Ali, 2002; Harry, 2007; Blair, 2009; Kinninmont, 2012), who have found that Kuwaiti businesses are suffering from corruption that inhibits improvement in many sectors.

Furthermore, it was revealed that because of nepotism and favouritism, firms can gain more projects regardless of their quality; this was also revealed in the interviews with the 27 managers, most of whom said that they can easily gain contracts based on links rather than quality. The experts also emphasised that there is no real urgency for firms to go beyond ISO, and no real competition in the Kuwaiti
market – and this was also highlighted by the K-SMMIs’ managers themselves. Furthermore, the experts highlighted lack of attention from the government as an issue, as the Kuwaiti government does not see the K-SMMI sector as important due to the country’s reliance on oil sectors only; again, this factor was also highlighted by the managers.

The experts further explained that the firms are lacking many of the aspects needed to initiate LS, such as:

- Leadership and commitment from top management.
- Knowhow and understanding of using and adopting LS.
- Acknowledgement of the prerequisites of LS, such as empowerment, involvement and training, which must be taken seriously.
- Strong relations with suppliers and customers.

Finally, the experts concluded that K-SMMIs are currently not ready to adopt LS, but emphasised that they have huge potential in this regard. However, this is conditional on the government creating a sense of urgency and putting pressure on firms, and also requires transparency from the government in terms of offering projects to qualified firms, regardless of links. Further, the government needs to monitor the ISO agents to make sure they are working with integrity.

Moreover, a shortage of training and recognition was highlighted in this study, and it was found that K-SMMIs are not adopting scientific methods to solve problems and improve processes. According to Mersha (1997), QI requires skilled people with an ability to work as a group and solve problems. This finding is consistent with Antony et al. (2008), who found that SMEs do not provide enough training, due to financial constraints.

Additionally, understanding and awareness of the benefits and principles of LS have been found to be very low, and knowledge of LS is missing in K-SMMIs. This finding is consistent with previous literature (Youssef and Zairi, 1995; Al-Khalifa and Aspinwall, 2000; Garza-Reyes et al., 2011), which suggests that Kuwait and nearby regions are far from maturity in terms of QI.
Most companies around the world opt to utilise LS because there is a sense of urgency and pressure from the market; this urgency can take the form of new entrants to the market, high levels of competitiveness, attention from the government to improve the industrial sector, and so on. None of these are a reality in Kuwait, since the market is very small, FDI is very low, and no attention is paid by the government towards the industrial sector. This is consistent with Mersha (1997), who asserted that if QI is to be successfully employed and sustained, the government must recognise its benefits.

As has been discussed in previous chapters, the LR framework that has been outlined in this study is based on six categories (processes; planning and control; human resources; top management and leadership; customer relations; and supplier relations), which represent the foundation of LS. It was found that the K-SMMIs scored less than 4 for each of the constructs. The following sections will show the reasons and justifications for the findings, with reference to the results obtained from every source (i.e. interviews, observations, case studies, and experts’ panel).

It is worth mentioning that the questionnaire was conducted first; although the outcome shows that the K-SMMIs are not ready for LS, some of the aspects in the questionnaire show some positive signs. However, these were contradicted by the other sources of data. The positives obtained from the questionnaire can be attributed to one reason, which is that Arab managers are sometimes reluctant to complete questionnaires, and most prefer to talk (Altarawneh, 2009), so they may not have taken the questionnaire seriously, and completed it merely as a favour.

The following sections will provide a discussion of the main findings on processes, planning and control, customer relations, supplier relations, HR, and top management and leadership, as well as the effect of ISO 9000, firm size, sector, and ownership type with respect to lean readiness within K-SMMIs.

6.2.1 Processes

The results from the questionnaire show that processes had the highest mean score, however this construct still scored less than 4. In relation to this factor, the aim was to identify issues such as process flow, housekeeping, production rate, cycle
time, TPM, flow of material, documentation, designated areas and labelled items, in order to evaluate the firms’ practices with respect to whether they support LS.

The questionnaire outcome showed positive signs in this category, as detailed in the results and findings chapter. However, the total mean is not satisfactory. According to Nordin et al. (2010), the 15 large lean companies they studied scored M>4, so in the present case the processes are not very supportive towards LS.

Many practices are considered a foundation of LS, such as housekeeping (5s) (Furlan et al., 2011; Liker, 2004; Miltenburg, 2001; Monden, 1998; Saurin et al., 2011, Shah, 2007; Spear and Bowen, 1999; Nordin et al., 2010; Forza, 1996), cellular manufacturing (Furlan et al., 2011; Liker, 2004; Monden, 1998; Saurin et al., 2011; Shah, 2007; Nordin et al., 2010; Forza, 1996), skilled workers for running and leading processes (Liker, 2004; Monden, 1998; Saurin et al., 2011; Shah, 2007), TPM (Black, 2007; Miltenburg, 2001; Saurin et al., 2011; Shah, 2007; Spear and Bowen, 1999), documentation (Almström and Kinnander, 2011; Saurin et al., 2011), and production based on pull (Shah, 2007; Womack and Jones, 2003).

From the observation, it was learnt that most of the K-SMMIs are lacking many aspects with regard to processes, such as labelling items, equipment and floor, providing designated areas for tools and equipment, ensuring the condition of tools and equipment is good (i.e. caring about their equipment), using a process layout (with good flow, low WIP etc.), keeping the workplace, storage areas, etc., clean and tidy, implementing suggestions systems, providing workers’ break rooms, and keeping records of important issues, such as cycle time, lead time, etc. The expert panel attributed this to the lack of the knowhow, plus the lack of competition in the Kuwaiti market.

This variable highlights many negative aspects within K-SMMIs that can be perceived from the low mean score (M<4), and are indicative that these firms are not ready for LS. One of the aspects that are not supportive of LS is TPM; according to LS, this process should be run by skilled workers, with clear documentation of all aspects. Failure to address these issues is almost certain to affect other operations in turn. The processes within K-SMMIs do not seem to be run efficiently; there is too
much WIP, and many types of lean wastes were observed during the case study visit and the observation.

6.2.2 Planning and control

From the questionnaire, it was found that the responses to the planning and control category also scored less than 4. This shows that there a lot of things missing in this category. The results show that there is a lack of understanding of many aspects that are required by LS, such as using VM, using scientific methods for solving problems, conducting focus groups, using benchmarks, etc., and most of these activities are largely ignored by K-SMMIs. Several authors (e.g. Furlan et al., 2011; Shah, 2007; Nordin et al., 2010; Yoshimori, 2005) have stressed the importance of efficient problem solving; however, it was found that K-SMMIs are lacking in this respect.

The interviews with managers suggested that these factors are being ignored as there are not enough skilled workers to contribute to solving problems in a scientific way; in addition, and importantly, they showed that they are not utilizing sophisticated production techniques that require them to adopt scientific methods for solving problems.

Benchmarking is another important method for keeping a close eye on the competitors; this factor is regarded as important by several researchers (e.g. Salaheldin, 2009; Gurumurthy and Kodali, 2009; Knuf, 2000; Hines et al., 1999; Spencer and Loomba; 2001; Smalley, 2004). In the questionnaire, the K-SMMIs stated that they are adopting the benchmarking method, however the interviews with managers showed that this is not the case: the managers know who their competitors are, but have no clear strategy for measuring themselves against these competitors.

Further, the expert panel agreed that benchmarking is not used in K-SMMIs for one simple reason: they are not aware of their competitors because there is no real competitive environment in Kuwait. They stated that the K-SMMIs are short-sighted because they do not consider external industries (outside Kuwait) as competitors, as they are not ambitious enough to think outside the box.
Furthermore, VM is not used in the vast majority of K-SMMIs, as can be seen from the negative responses to the questionnaires, and the observations. Further, the lack of VM was noted during the case study visit; most of the firms are ignoring this factor, and this is similarly due to a lack of knowhow and awareness. Many researchers have declared the importance of VM (e.g., Shah; 2007, Radnor et al., 2006; Moser and Dos Santos, 2003). According to Moser and Santos (2003), lack of VM control may cause poor understanding of the process.

Tezel et al. (2009) declared that the main use of VM in LS is for enhancing disciplines and transparency. In Toyota, VM is heavily used at workstations to show the work procedures, standard inventory and cycle time (Ohno, 1988). In addition, standard operations and manuals are posted at workstations so that supervisors and workers can follow standards without wasting time (Fujimoto, 1999). Problem-solving techniques such as cause and effect diagrams, flowcharts, check sheets, Pareto diagrams, histograms, scatter diagrams, and control charts are also employed within Toyota; yet none of these practices are being utilised within K-SMMIs.

According to Tezel et al. (2009), VM is employed to allow managers and supervisors to monitor work at a glance, as well as to simplify the process for employees; this helped Toyota to solve 95 per cent of its problems related to quality.

Tezel et al. (2009) suggested that VM can support LS by enhancing the transparency in the workplace, as it allows workers to understand the process at a glance, without the need to go back and ask, which wastes time. In addition, VM makes people more disciplined in relation to working based on correct procedures and standards.

As as result of this transparency and discipline, any problems will be more visible and workers will be motivated to solve them and keep improving, as they are following visible standards that will mitigate improvisation, and in turn help to sustain CI.

VM can also enhance job facilitation, as employees will save huge amounts of time by having everything visible at workstations; further, it can help with performing on-the-job training as people will learn from their mistakes. It can make
workstations tidier and easier to work in, and make the organisation work as one unit, as the boundaries will be removed between organisational layers.

VM can be achieved by making the process flow visible from start to finish by posting the related information in a visible place. In turn, this can reflect positively on employees as they will be more motivated to participate in improving the process. Any problems will also be more visible and easier to solve.

Moser and Santos (2003) highlighted the benefits that can be gained by employing VM, in that it: improves simplification and coherence in decision making; stimulates informal contacts throughout different hierarchical levels; contributes to the introduction of decentralisation policies; helps to broaden employee participation and autonomy in management; enhances effective distribution of responsibilities; increases employee morale; improves the effectiveness of production scheduling; simplifies production control systems; and ensures rapid comprehension of, and response to, problems.

Once again, the managers’ responses within the interviews show that their processes and activities are simple and they do not wish to make them complicated by using VM, which requires time and updates on a regular basis. However, the K-SMMIs will most certainly be missing out on the benefits of adopting VM.

From the responses on planning and control, it was learnt that the K-SMMIs’ planning and control practices are not supportive towards LS since the total mean score for this variable was again less than 4, and from the structured observations and the semi-structured interviews it can be confirmed that many things are missing within K-SMMIs. In order for the K-SMMIs to be ready for LS, they must get most of these practices right as they represent a foundation for LS, as was discussed in Chapters 2 and 4. As it stands, the K-SMMIs are missing key aspects that would help them to improve their production.

6.2.3 Customer relations

Many researchers have highlighted the importance of customer relations (e.g. Zu et al. 2010; Golicic and Medland, 2007; Panizzolo, 1998; Meredith et al., 1991; Goodson, 2002) for LS. K-SMMIs scored very low (M=2.5) in this variable, which
shows their lack of awareness towards this factor. It was found that the K-SMMIs are not involving their customers and are not dealing with customer complaints or feedback in a serious manner. Several researchers (e.g. Zhang et al., 2000; Found and Harrison, 2012) have stated that organisations need to respond quickly to customer complaints, and understand their customers’ needs.

This variable revealed that there are many related negative practices by K-SMMIs that are not supportive of LS, as can be observed from the total mean score, which was less than 4. Further, in the interviews with the 27 managers, none were able to cite a clear strategy for dealing with customers; the expert panel explained that customers in Kuwait are unlike customers in the rest of the world; there is little diversity in the market for them to find better service or quality, so companies do not fear losing them.

Customers are key players for LS, and keeping tight relations with customers will lead to many good things that the firms can benefit from. However, achieving these strong relations with customers requires huge efforts from firms. As it stands, K-SMMIs are not doing enough to maintain customer relations.

6.2.4 Supplier relations

Supplier relations are considered to be one of the important factors for LS (e.g. Zu et al., 2010; Golicic and Medland, 2007; Panizzolo, 1998; Meredith et al., 1991). Quality suppliers enable companies to produce quality products (Zhang et al., 2000); this is important in LS, as the long-term relationships with suppliers will enable the company to perform JIT, which is essential for LS (Dayton, 2001; Found and Harrison, 2012).

This variable had the lowest mean score (M=2.3), which shows that the companies lack awareness towards the importance of these factors. Most of the interviewees from the 27 K-SMMIs complained about their suppliers’ quality, and there were specific complaints regarding the delivery speed and quality of products. Nevertheless, none of the K-SMMIs gave any evidence of trying to build strong relations with suppliers. All the managers prefer to deal with large numbers of
suppliers to get better prices. It seems that the suppliers and firms are highly disjointed.

This is again not very supportive towards LS. According to the expert panel, supplier relations in Kuwait are not yet in a mature stage, due to a lack of awareness towards the importance of building strong relations with suppliers to help the company save effort and money. According to Wu (2003), it is essential for LS for firms to have dependence, mutual trust, and long-term relationships with their customers and suppliers; Sharma et al. (2011) further stated that suppliers are willing to reduce their prices if there is a long-term relationship, and can contribute to enhancing the profitability and competitiveness of the company.

Helper (1991) suggested that in LS suppliers play a major role in terms of JIT, design and subassembly, and that this is only achievable if there is a long-term relationship. According to Burman (1995), having quality suppliers can save firms time and money by providing them with quality goods, as most companies who are dealing with lean suppliers do not have to inspect the goods received. Sharma et al. (2011) asserted that there is a need to involve suppliers in quality improvement programmes; this was not seen within K-SMMIs, as the responses to the questionnaire, as well as to the interview, showed that supplier relations are highly neglected.

Further, LS requires very close relations with suppliers and customers in order to ensure quality (of products, items, raw materials, etc.) and fast delivery, which are essential to performing JIT (Levy, 1997). Further, strong relationships with suppliers can help the company to solve quality problems (Treleven, 1987). According to Sharma et al. (2011), Toyota has highly involved and encouraged its suppliers to share information and help in developing the design process.

Furthermore, it was found that most of the K-SMMIs prefer to deal with large numbers of suppliers, which is not healthy for LS. Many researchers (e.g. Barla, 2003; Cooper and Slagmulder, 1999; Lubben, 1988) have explained the importance of dealing with single suppliers; the advantage can be seen in the development of long-term relationships, which can in turn provide consistent quality, lower costs, special attention, savings on tooling, etc. (Ansari and Modarress, 1998). Further, Cooper and Slagmulder (1999) said that many lean organisations are dealing
with single suppliers for each part, and normally get perfect products that do not require an inspection, and are delivered on time.

Again, there are a lot of negative practices in this area by K-SMMIs with respect to LS, as can be observed from the total M score, which was less than 4. In order for any organisation to implement LS, it must have great relationships with its suppliers, but in the Kuwaiti case the survey does not reflect this, and neither do the interviews with the managers.

6.2.5 HR

There are many aspects of HR that are required by LS, such as training, empowerment, involvement and recognition (Kumar et al., 2009; Zu et al., 2010; Mefford, 2009; Zhang et al., 2012; Goodson, 2002). These aspects are required in order to produce high-quality products. As highlighted from the literature review, employees are the core of the company, and therefore need to be encouraged and involved in company strategy and direction, especially when implementing LS. Without skilled workers, LS will not last (Tsang and Antony, 2001).

The outcome of the questionnaire shows that K-SMMIs are lacking in this regard. This can be seen from the low mean score (M=2.9), which indicates that too many issues are being ignored by K-SMMIs. Amongst these issues is training; as Ichimura et al. (2007, p. 175) stated, “Training can also build loyalty to the company, improve worker moral and develop motivation”. Similarly, according to Pennathur and Mital (2003), loyalty is essential for LS as it provides stability for the organisation and workers who are more committed towards solving problems and continuing to participate in improving the process. It was found from the interviews with the 27 managers that they do not have clear training systems in place, and most of them are relying on training offered by the Kuwaiti government, which does not always reflect company needs.

Ichimura et al. (2007) declared that training has to be based on the company’s needs, so organisations must have a proper understanding of its requirements, and understand the benefits of LS, lean philosophy and lean requirements to be able to offer proper training; this can only be achieved if the organisation has a strategy and
vision. High-quality training will enhance the efficiency and productivity of the organisation (Pennathur and Mital, 2003). Ichimura et al. (2007) further suggested that workforce training is the “spine” of LS; and a huge number of lean proponents have emphasised the importance of training (Pennathur and Mital, 2003). Unfortunately, this aspect is highly ignored by K-SMMIs.

The managers attributed the lack of the training to several issues, with one of the most prominent being that they do not really need training in place as their machines are not complicated, and they lack financial support for training.

The lack of training was also noted in the case study visits, since neither of the visited firms offers quality training for their workforce. Further, many of the experts explained that K-SMMIs have a low-quality workforce, and management are not doing enough to improve them.

The lack of motivation in K-SMMIs is also a serious hindrance to LS. MacDuffie (1995) stressed the importance of boosting worker morale and motivation; failure in this regard will impede the whole lean journey. Motivated workers will collaborate to solve problems and help in CI, so the success of LS is dependent on whether the workers are willing to participate; if they feel deflated, they are likely to ignore or close their eyes to problems.

According to Takeuchi et al. (2008), Toyota encourages its managers to motivate people and get the best from them; in Toyota, evaluations for managers are based on process performance and learning ability, with less emphasis on results. Toyota’s main concern is how managers deal with issues, how they foster people skills, and how they develop and empower people. From the observations it was found that many aspects relating to motivation and morale are being ignored. These aspects include: ensuring a safe environment (ventilation, health and safety clothes, etc.), providing worker uniforms, keeping the workplace and storage areas clean and tidy, and providing workers with break rooms. These issues were also witnessed during the case study visits. The expert panel commented that most firm managers are only thinking about making money, and do not see soft issues, such as motivation and workers’ morale, as an imperative. In addition, from talking with many workers and managers it was found that because most of the workers come
from relatively poor countries they do not complain about working conditions, and managers are taking advantage of them.

Another aspect of motivation is having a recognition and reward system in place; from the interviews it was understood that in K-SMMIs that there are no clear reward or recognition systems. If the firms do well and make a good profit the workers will be rewarded with a small amount of money (as low as 60 GBP). Workers are not offered a reward for coming up with new ideas or suggestions to improve the process, or cut some stages, and this also indicates a lack of empowerment and involvement. Most of the firms are not empowering their people; the interviewed managers alleged that because their labourers are not highly skilled, the managers do not tend to involve or empower them; in addition, most of the workers do not speak a common language, which makes involvement even tougher.

The lack of communication and teamwork is highly affected by the lack of common language. Radnor et al. (2006) suggested that communication is very important, as it helps to ensure that LS is implemented successfully and ensures that recognition is given for peoples’ efforts during the process. In addition, sharing knowledge between departments helps to motivate other departments that are not involved in the process, maintain the momentum of CI, and sustain changes. Ghobadian and Gallear (1997) also highlighted the importance of efficient communication, and regard it as an important factor for achieving QI, as the employees are the engines of SMEs, and without proper communication that shows them exactly what the company is expecting from them they might not be able to perform to the best of their abilities.

Similarly, teamwork is very crucial in the lean journey, as it will help in generating more buy-in from workers. “It was reported that team work allowed organisations to generate capacity for improvement, it helped to reduce the hierarchical boundaries between staff where improvements were required, and developed a sense of joined-up working in a whole system” (Radnor et al., 2006, p. 5). According to Ichimura et al. (2007, p. 175), LS is “completely based on […] team work; therefore, team work is considered as the heart of [LS].”
These issues are most certainly delaying the use of LS with Kuwaiti firms. This was also shown in the observations and case study, where it was found that the vast majority of firms do not have a clear suggestions system in place.

Within the HR variable, many negative signs were identified within K-SMMIs, and again the total mean score is less than 4. Key features, such as empowerment, motivation, involvement, skills and multitasking workers are highly valued in LS but are lacking in the K-SMMIs, which might negatively affect their readiness towards LS.

Further, the current investigation shows the reasons behind this lack of empowerment, motivation and employee involvement within K-SMMIs. It is understood that Kuwaiti firms do not pay attention to these aspects as there is a huge distance between top-level people and shop-floor people, with some managers citing the lack of quality labour and language barriers as a factor, and others highlighting the simplicity of their businesses. The expert panel suggested that K-SMMIs lack leadership and awareness from top management in relation to these issues.

6.2.6 Top management and leadership

As has been emphasised by the vast majority of prior research, top management and leadership is the most crucial factor for LS. The role of top management and leadership is manifested in many forms, such as providing clear vision, allocating resources and funding, and providing strategic leadership (Tsang and Antony, 2001). To ensure the success of LS implementation, it is essential for top management to create a quality culture by empowering other employees (Zhang et al., 2000). This factor has been emphasised in various articles (e.g. Chin and Pun, 2002; Angelis et al., 2011; Bakås et al., 2011; Zu et al., 2010; Mefford, 2009; Kumar et al., 2009; Achanga et al., 2006; Panizzolo, 1998; Meredith et al., 1991; Snee, 2010).

This factor, like the other factors, was not positive for K-SMMIs’ LR, as the mean score was again low (M=3.2). The expert panel attributed this to a lack of leadership to drive changes, and a lack of top management commitment, as they believe that K-SMMIs are lacking a quality culture in these areas.
This was identified through the case study, and from the ISO 9000 example it was found that most of the firms do not involve their employees in the decision to become ISO accredited, which results in frustration, as well as a lack of buy-in from workers.

Furthermore, the top management does not seem to be committed towards QI, as can be seen again from the ISO 9000 example; most of the firms opted to obtain ISO 9000 in order to increase sales, and not for improvement, which is why it took their people by surprise. Most of the experts explained that there is no real top-management commitment and leadership within K-SMMIs; they believe that the majority of people at management level do not have a great deal of knowledge about QI, and are not well educated about what QI can bring to them. This is reflected in the failure to use certain practices within their organisation, such as empowerment, involvement, teamwork, training, consultancy, etc., all of which are supportive towards LS. This is in line with Al-Khalifa and Aspinwall (2000), who suggested that QI may not work for the GCC region as countries in this region have unfavourable environments that do not support QI due to the autocratic management that is in place, as the organisation is always run by the boss, there is a very poor level of communication between people and departments, and the top managers are unaware of concepts around QI.

From this variable, it can be understood that the top management and leadership variable is lacking in K-SMMIs; the low M score shows that K-SMMIs are not very supportive towards LS in this regard.

Based on the six variables and the findings from the semi-structured interviews (27 managers), structured observations, case study, and interviews with the expert panel, the K-SMMIs’ practices do not support LS; they are lacking in many aspects, which need to be given deep consideration. It was found that there are many obstacles preventing K-SMMIs from being efficient in their working processes. The managers showed a lack of understanding and awareness of how small steps can help them to reach the optimum production level. Further, most of the managers in K-SMMIs showed no real urgency to be lean, as the competition is very low in Kuwait. It was also found that there are external reasons inhibiting the potential of K-SMMIs towards LS, and the lack of quality and management practices
within K-SMMIs mainly comes from a lack of urgency. The findings in this area can be summarised as follows:

- There is no real urgency to force Kuwaiti firms to adopt LS, as their customers do not have much knowledge about quality.
- Firms can get contracts without having QI in place.
- There is little competition in the market.
- Firms can gain contracts based on links and nepotism.
- The government does not see the manufacturing sector as a real source for developing the economy, and the sector is thus largely ignored.
- The K-SMMIs do not take government rules and regulations seriously, as can be seen within different aspects, such as the working conditions within the firms and the implementation of ISO 9000. The ISO 9000-accredited firms adopted ISO 9000 only for sales motives; it has not been reflected in their product quality because they know the government does not place emphasis on the quality of products.

These findings support those of Stone (2012, p. 230), who stated that, “currently, many organizations are experiencing external forces overpowering internal resistance to change, resulting in an opportunity for transformational interventions focused on performance improvement to create sustainable, healthy organizations”.

Further, Nordin et al. (2012) said that organisations only pursue LS if they feel pressure to do so; this pressure can be either domestic, and arising from high competitiveness market, or international. It was found that K-SMMIs are overpowered by the external factors, which leads to their avoidance of LS. This has meant that K-SMMIs are maintaining their current quality and management practices, and are not considering implementing LS.

Furthermore, it was found that the K-SMMIs are lacking in many internal respects, and this has led to a lack of quality culture. These issues include:

- Lack of knowledge about LS in Kuwaiti firms.
Lack of knowledge about the key issues that are considered important for LS in terms of respect for people, such as rewards, involvement, motivation, empowerment, etc.

No means by which to solve technical issues, as there are no skilled workers, training programmes, or scientific methods in place to solve problems and improve processes.

Poor communication between top-level and shop-floor people, for reasons such as language barriers, and mistrust between these levels.

Language barriers, as well as a lack of quality workers in terms of education and skills.

Lack of empowerment or real involvement for employees.

No use of technology by which to communicate between departments.

Failure to follow a clear strategy in terms of involving employees in improving processes, nor in promoting CI.

Lack of top-management support and leadership.

All of these factors are contributing towards the lack of quality and management practices within the K-SMMIs. This disproves the findings of Mady (2009), who stated that Kuwaiti manufacturing industries are using quality and management practices (his study included large, medium and small industries). Mady (2009) conducted his study with help from KPAI, who distributed his survey questionnaire to firms to complete. This could be one reason why the findings differed, since this help from KPAI might have made firms more likely to give honest answers, or, alternatively, to hide facts and fail to answer based on the current situation.

However, the present study relied on multiple sources of data, unlike Mady’s (2009), so the findings may be more realistic and give a truer picture of K-SMMIs with respect to quality and management practices. Further, Mady (2009) focused on only two sectors, one of which was food, which could not be included in this research as several food firms do not fall within the study’s size criteria (small and medium), while others failed to show interest in participating.
The findings of this study support those of a number of other researchers, such as Graza-Reyes et al. (2011), who claimed that Kuwait is still not mature enough to understand QI. The low use of quality and management practices identified within K-SMMIs also supports the claims made by Jaeger et al. (2013), who found that quality and management practices are not taken seriously in the GCC region, and are not really used. The findings regarding the lack of leadership, focus on customers, and scientific methods for measurement and analysis, are also consistent with Jaeger et al. (2013).

Further, the findings on the lack of CI, customer relations, supplier relations, empowerment and top-management support are also in line with the findings of Graza-Reyes et al. (2011). They also agree with those of AL-Nofal et al. (2004), who similarly found that there is no involvement and commitment at the shop-floor level, as well as a lack of commitment towards QI from the top management, a lack of quality culture, and no close relationships with customers and suppliers.

Further, it was found that the K-SMMIs are lacking top-management commitment and leadership quality, and this is consistent with Ghobadian and Gallear (1997), who found that SME owners and top management are unaware of key managerial aspects that are essential for initiating QI. This finding is consistent with Yusof and Aspinwall (1999), who identified some of the factors that affect Qatari SMEs with respect to the implementation of QI. Among these factors are: human and technical aspects, lack of resources, and shortages of finance.

In addition, the lack of training found in K-SMMIs is consistent with Antony et al.’s results (2008); they found that SMEs do not provide much training due to financial constraints. Hill and Stewart (2000) also suggested that SMEs offer little training and are reluctant to spend on this area; any training systems that are in place in SMEs are unplanned, reactive, short-term oriented and informal. This supports the present study’s results in relation to K-SMMIs, especially from the interviews with the 27 managers, who claimed that they do not have enough money to spend on training and are relying on government initiatives, which do not always fit their firms’ needs.

Several issues have been identified in the research literature, such as nepotism and favouritism (Abdalla and Al-Homoud, 2001; Kinninmont, 2012);
though this was not identified in direct relation to LS within K-SMMIs, the findings show that it inhibits the adoption of LS as most K-SMMIs can easily obtain contracts and projects based on relatives or links. This in turn removes their motivation to implement LS or other QI, since they can sell their products without having LS in place, and thus do not need to spend money on it.

When the findings of this study are compared to those of other researchers in the Arab world, similarities can be noted; for instance, in the K-SMMIs there is a lack of top-management commitment and support, training and education, supplier quality, worker empowerment and involvement, and customer relations. Kuwait shares these problems with Palestine (Baidoun, 2004), the UAE (Badri et al., 1995), Saud Arbia (Al-Omaim, 2002) and Qatar (Al-Khalifa and Aspinwall, 2000). Table 67 summarises the factors that are affecting QI in the Arab world according to the literature, which matches the findings of this study.
<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>Inhibitors</th>
</tr>
</thead>
</table>
| Al-Sulimani (1995)     | Saudi Arabia | • No clear vision or objective  
• Lack of support from senior management  
• More focus on quick profit rather than quality  
• Less focus on service and quality  
• No documented policies or procedures  
• Limited information about QI  
• Lack of understanding about QI |
| Al-Zamany *et al.* (2002) | Yemen     | • Lack of government support  
• Lack of understanding of TQM  
• No supportive organisational culture for LS |
| AL-Nofal *et al.* (2004) | Kuwait   | • Lack of top-management commitment  
• No visible involvement of top management in quality  
• No customer relations  
• No clear mission statement  
• Quality planning is missing  
• Decision making at lower levels is missing  
• Lack of effective communication between employees and management  
• Employee commitment and enthusiasm is missing |
| Baidoun (2004)         | Palestine | • Lack of top-management commitment and involvement  
• Lack of middle-manager and employee commitment and involvement  
• Training and education is missing  
• Lack of quality infrastructure  
• Lack of formally documented quality management system  
• No communication |
| Salaheldin (2005)      | Egypt     | • Limited knowledge about JIT  
• Problems with supplier relationships  
• Costs too high  
• Successful without JIT implementation  
• Benefits of JIT not deemed to be worthwhile  
• Potential staff attitude problems  
• Lack of formal training/education |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Country</th>
<th>Barriers to Lean Six Sigma (LS) Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaheldin (2009)</td>
<td>Qatar</td>
<td>- Lack of communication between workers and management for workers</td>
</tr>
<tr>
<td>Hokoma et al. (2010)</td>
<td>Libya</td>
<td>- Lack of leadership and top-management support</td>
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<tr>
<td></td>
<td></td>
<td>- Organisational culture is not supportive</td>
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<tr>
<td></td>
<td></td>
<td>- CI is missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- No use of benchmarking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Quality goals and policies are missing</td>
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<td></td>
<td></td>
<td>- Team building and problem solving are missing</td>
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<tr>
<td></td>
<td></td>
<td>- Lack of employee empowerment, involvement and training</td>
</tr>
<tr>
<td>Ab-Rahman et al. (2011)</td>
<td>Libya</td>
<td>- Lack of employee involvement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lack of recognition for employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lack of commitment from staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lack of resources, such as finances, technology and governmental support</td>
</tr>
<tr>
<td>Karim et al. (2011)</td>
<td>Saudi Arabia</td>
<td>- Organisational culture is not supportive towards LS adoption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Resistance from shop-floor personnel</td>
</tr>
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<td></td>
<td></td>
<td>- Employees not convinced about the benefits of LS</td>
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<td></td>
<td></td>
<td>- Lack of cooperation from suppliers</td>
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<tr>
<td></td>
<td></td>
<td>- Lack of top-management commitment</td>
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<tr>
<td></td>
<td></td>
<td>- No customer relationships</td>
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<td></td>
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<td>- Lack of market knowledge</td>
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<td></td>
<td></td>
<td>- Inspection and checking of work is not carried out</td>
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<td></td>
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<td>- Assessments of suppliers’ performance is missing</td>
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<td>- No use of information technology</td>
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<td></td>
<td></td>
<td>- No supplier relationships and poor-quality suppliers</td>
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<td></td>
<td></td>
<td>- Lack of senior managers’ support towards the implementation process</td>
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<td></td>
<td></td>
<td>- Unfamiliarity with QI</td>
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<td></td>
<td></td>
<td>- Lack of effective management</td>
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<tr>
<td></td>
<td></td>
<td>- Inadequate knowledge of QI</td>
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<td></td>
<td></td>
<td>- Lack of leadership</td>
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<td></td>
<td>- High cost</td>
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<td></td>
<td></td>
<td>- Lack of time to implement</td>
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<td></td>
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<td>- No recognition of financial benefits</td>
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<tr>
<td></td>
<td></td>
<td>- Lack of skilled manpower for LS implementation</td>
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<td></td>
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<td>- Lack of resources</td>
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6.2.7 ISO 9000 accreditation

Furthermore, ISO 9000-accredited firms have similar practices to non-ISO 9000 firms, but neither were found to be supportive of LS, and the only significant differences were related to top management and leadership practices. This can be attributed to the motives behind adopting ISO 9000; it was revealed in the semi-structured interviews that K-SMMIs mainly adopt ISO 9000 to gain more contracts and boost their sales – in other words, they are externally driven and do not adopt ISO 9000 to improve their internal processes; this is in agreement with Gherbal et al. (2012), who found that Libyan industries are adopting ISO 9000 for prestige purposes only. This is also in line with Gotzamani and Tsiotras (2001), who claimed that ISO 9000 only affects organisational performance positively and makes it ready for other QI, such as LS and TQM, if it is adopted to improve internal processes.

Furthermore, the expert-panel interviewees suggested a new reason for ISO 9000 not affecting the K-SMMIs: the experts stated that a significant number of K-SMMIs are buying ISO 9000 from corrupt agents, as the government is not monitoring the quality of products, and firms only need to obtain the ISO certificate to sell their products to the government.

However, the results contrast those of other researchers, who have suggested that ISO 9000 has improved quality and management practices within firms. For instance, Magd (2006) found that ISO 9000 improved the quality systems in Saudi firms in terms of documentation procedures, quality awareness, quality of products and customer service, working instructions and procedures, communication among employees, quality of incoming materials, reduced defective rates and wastes, leading to CI and expansion to international markets.

Ilkay and Aslan (2012) demonstrated a significant difference between Turkish ISO and non-ISO firms in terms of using and understanding quality and management practices. They found that ISO firms have better quality and management practices in terms of top management, quality system processes, supplier relations and process control improvement. Gotzamani and Tsiotras (2001) found that there is a huge difference between Greek ISO and non-ISO firms, with ISO firms performing better in terms of leadership, strategic quality planning, quality
data, human resource management, process management, supplier and customer relations, and product design. Sohail and Hoong (2003) conducted a study in Malaysian SMEs (ISO and non-ISO firms), and found that ISO firms have higher customer management and quality satisfaction, as well as improved strategic planning, leadership, information availability and analysis, employee empowerment and development, and organisational control and performance.

6.2.8 Firm size

Firm size does not seem to have an impact on the quality and management practices used; both types of firms were found to have a similar level of quality and management practices, and there were no significant differences in terms of size, which is in accordance with Mallur et al. (2011). However, this result contradicts Mady’s (2009) findings, which suggested that there are significant differences between small and medium-sized Kuwaiti industries, and that medium-sized firms use quality and management practices more effectively. Further, Mady (2009) demonstrated significant differences in customer focus between the two firm sizes, especially in terms of dealing with customer complaints and process quality. He found that medium-sized firms make better use of benchmarking, process improvement, data-driven decisions and SPC.

6.2.9 Sector and type of products

The results show that there are no significant differences between the four different sectors (Sector 1: paper, paper products and printing; Sector 2: chemicals, petroleum products, coal, rubber; Sector 3: non-metallic minerals (except petrol activity); Sector 4: metal product machinery and equipment activity) in terms of the use of quality and management practices, since the mean score for the four sectors was found to be almost identical, and none of them have great readiness towards LS. This result is in agreement with Mady (2008), who found that there are no differences among the different types of sectors in Kuwait in terms of their perception of competitiveness priorities such as flexibility, on-time delivery, cost reduction, innovativeness and quality improvement. The reason for this could be attributed to the lack of competitiveness in the Kuwaiti market, and the fact that most
types of industries are supplying to the local market; however, these results differ from those of other authors (Reed et al., 1996; Corbett and Rastrick, 2000; Curkovic et al. 2000), who verified that different sectors have different uses of quality and management practices.

Further, this result is not in agreement with Mady (2009), who found that there is a difference in the quality and management practices used by different sectors in Kuwait; as was explained in the previous section, Mady (2009) focused on two sectors only, including food, while this study considered four sectors, of which the food sector was not one. This finding also disagrees with those of Ab-Rahman et al. (2011), who identified different quality and management practices within Libyan manufacturing industries. Similarly, this study does not support the findings of Paksoy et al. (2011), who found that there is a difference in terms of the perception of TQM within four sectors (iron-steel, automobile, textile, and plastic); they highlighted that the iron–steel sector is making the strongest TQM efforts, while the textile sector was found to be the worst sector in this regard.

Furthermore, this study did not support the findings of Shahram (2008), who found that there is a difference in terms of lean practice usage within different sectors in China (electronics, telecommunication, wireless, computer, food/beverage, garment, pharmaceutical, chemical, petroleum, printing, A/C and heating); Shahram found that the petroleum industry was ahead of all other industries, followed by computer, telecommunication/wireless, electronics, garment, food and beverages, pharmaceutical, printing, and A/C and heating industries, respectively.

As was explained in Chapter 3, sector has not been emphasised as a factor that affects LS, as many authors have suggested that LS can apply to many different types of industry (Womack et al., 1990; Soriano-Meier and Forrester, 2002). Further, this study is the first to deal with LS in the Kuwaiti context, so it is necessary to build a foundation from which to obtain a better understanding of Kuwaiti firms. Thus, the findings on sectors cannot be compared to any great extent with those of previous studies.
6.2.10 Ownership structure

Moreover, it was found that ownership (family- vs. non-family-owned firms) does not affect LR, as no real differences were noted between family- and non-family-owned firms for any of the constructs. Both firm types scored M<4, which again shows that the current quality and management practices in both family- and non-family-owned firms are not supportive towards LS. As the results illustrate, there were no significant differences between the different ownership structures in terms of their use of quality and management practices.

This result is inconsistent with those of many researchers (e.g., Ellington et al., 1996; Levinson, 1987; Ward, 1988; Hofer and Charan, 1984), who found differences in the implementations of quality and management practices by the two types of firms, and suggested that non-family-owned organisations have a better chance of adopting quality and management practices. Ellington et al. (1996) found that family-owned firms are adopting fewer quality and management practices, because they are more short-term oriented. Further, Ellington et al. (1996) explained that family-owned firms are more centralised in their decision making, as the top managers are involved in every decision; this is why they cannot adopt a holistic approach towards QI. Despite this, this study did not highlight any real differences between family- and non-family-owned firms.

The findings also disagree with several authors (Welsh and Raven, 2006; Chua et al., 1999; Davis, 1983) who have claimed that family-owned businesses are likely to have better relations with customers and be better able to manage their resources; neither of these were shown in this study. Also, the findings contradict those of Reid and Adams (2001), who suggested that business practices with respect to human resource management (HRM) differs between the two types of firms, with family-owned businesses having distinctive HRM practices compared to non-family-owned businesses – although the authors did not say which business type has better practices.

Further, the findings disagree with Astrachan and Kolenko (1994), who claimed that family-owned businesses have a shortage of capabilities to implement HRM practices, which makes them lag behind non-family-owned businesses. Graves and Thomas (2006) also found that the non-family-owned firms have better
managerial capabilities compared to family-owned firms; this was not the case in the present research study, as both types of firms in the Kuwaiti context were found to be in a similar position with regard to the use of quality and management practices.

Based on the findings of this study, ISO 9000, firm size, ownership structure and sector do not affect readiness towards LS within K-SMMIs, as there are no significant differences between these categories. All of the firms showed low levels of quality-practice adoption (M<4). This conclusion supports the findings from the expert panel and case study, as well as from interviewing the 27 managers, which suggest that K-SMMIs are overpowered by external factors, as explained in previous sections, and that, due to their lack of urgency arising from the lack of competition in the market, firms can gain contracts based on links and nepotism rather than quality; in addition, the government does not see the manufacturing sector as a real contributor to the economy. In this sense, it can be concluded that the level of K-SMMIs’ readiness towards LS is very low, and it may be that LS will not work well within them at this point.

6.3 Chapter summary

In this chapter, a discussion of the findings obtained from the different sources of data (questionnaires, semi-structured interviews, observations, case study, and expert-panel interviews) are presented, with reference to whether they agree or disagree with those of other researchers. The main findings suggest that K-SMMIs are far from being lean ready, and there are external and internal factors affecting their readiness towards LS. Based on the findings of this study, ISO 9000, firm size, ownership structure and sector do not affect readiness towards LS within K-SMMIs; this finding is in agreement with some researchers’ findings, while disagreeing with others. Furthermore, from this chapter it was learnt that the status of the K-SMMIs as far as obstacles for adopting QIs is concerned is similar to firms in other nearby regions (i.e. Arab and Gulf regions).

The chapter also discussed the external and internal reasons that are affecting the K-SMMIs’ readiness towards LS. Several issues were identified in this chapter as preventing K-SMMIs from adopting LS, and affecting the six categories considered
(processes, planning and control, customer relations, suppliers relations, HR, and top management and leadership).

The outcome from the questionnaire survey and the findings from the semi-structured interviews (27 managers), structured observations, case study, and interviews with the expert panel, show that the K-SMMIs’ practices do not support LS; they are lacking in many respects, which need to be given deep consideration. Further, it was found that there are many impediments precluding K-SMMIs from being efficient in their working processes. The identified factors include: no real urgency to force Kuwaiti firms to adopt LS, as their customers do not have much knowledge about quality; the firms can get contracts without having QI in place, and can gain contracts based on links and nepotism; there is no real competition in the Kuwaiti market; and the government does not see the manufacturing sector as a real source for developing the economy, so that the sector is largely ignored.

Finally, the K-SMMIs do not take government rules and regulations seriously, as can be seen in aspects such as the working conditions within the firms and the implementation of ISO 9000, where ISO 9000-accredited firms adopted ISO 9000 for sales motives only; it has not been reflected in their product quality because they know the government does not place emphasis on the quality of products.
Chapter Seven  Conclusions

7.1 Introduction

This chapter presents the conclusions of the study, including a revision of the main aims and objectives of the research, the RQs and methodology, as well as directions for future research, recommendations, limitations, and the contributions and implications of the study.

The main aim of this research was to consider the general situations of K-SMMIs in order to identify their readiness to adopt LS, by measuring their current situation (based on their quality and management practices), and by identifying the factors that are affecting their readiness towards LS.

The study started by reviewing the available literature in order to build a database of potential factors that may contribute towards LR. It is worth mentioning that the literature review found a lack of studies relating to K-SMMIs, and LS within the Kuwaiti context in general.

This study is based on a position of pragmatism, and inductive and deductive approaches were used to help reach the objectives of the research. Mixed methods were adopted to avoid the weaknesses of a single method and to enhance credibility and validity by collecting data from multiple sources; the forms of validity used were triangulation, expert-panel interviews, and pilot testing. Several techniques were adopted in this research study, such as questionnaires, observations and interviews (with K-SMMI managers and shop-floor staff, an expert panel, and personnel in the Kuwaiti government), while the strategies employed were case study and survey. These helped to answer the six main research questions within this study to draw a complete picture of K-SMMIs’ readiness towards LS. As this study is the first of its kind within the Kuwaiti context, it was unable to rely on one source of data as the intention was to obtain a clear picture of K-SMMIs.
7.2 Aims and objectives

This research project aimed to consider the general situations of K-SMMIs to identify their readiness to adopt LS and identify the factors that are affecting their readiness towards LS.

Furthermore, this study aimed to examine how the introduction of LS to K-SMMIs could create awareness about the benefits that LS could bring, and help them to improve their businesses.

In order to achieve the aims of this research, the main objectives were outlined as follows:

1. To identify the essential factors required by LS.
2. To investigate the general state of K-SMMIs.
3. To get a clear understanding of current quality and management practices used by K-SMMIs.
4. To develop an LR framework to measure K-SMMIs’ readiness towards LS.
5. To identify and analyse the different barriers and enablers for implementation of LS in K-SMMIs.

The results of the study show that K-SMMIs are not ready, or do not feel a sense of urgency, to adopt LS. This conclusion was derived after reviewing a large amount of literature, and gathering data from different sources such as questionnaires, semi-structured interviews structured and unstructured observations, a case study and a discussion with an expert panel. Table 68 shows how the objectives of this research have been achieved.
<table>
<thead>
<tr>
<th>Objective</th>
<th>How it has been achieved</th>
</tr>
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<tbody>
<tr>
<td>1. To identify the essential factors required by LS</td>
<td>The essential factors were identified by reviewing the research literature; the researcher was able to extract and address the critical requirements for LS.</td>
</tr>
<tr>
<td>2. To investigate the general state of K-SMMIs</td>
<td>In order to understand the readiness of K-SMMIs towards LS, there was a need to understand and identify several issues, such as the general state of K-SMMIs in terms of their contribution towards the Kuwaiti economy and job creation, and the QIs adopted by those firms, as well as identifying the factors that are inhibiting their potential to compete with world-class organisations.</td>
</tr>
<tr>
<td>3. To get a clear understanding of current quality and management practices used by K-SMMIs</td>
<td>The outcome of the survey questionnaire showed that K-SMMIs use minimal quality and management practices. The reasons behind this were identified and explained by obtaining data from different sources such as questionnaires, semi-structured interviews, observations, case study, and expert-panel interviews.</td>
</tr>
<tr>
<td>4. To develop an LR framework to measure K-SMMIs’ readiness towards LS.</td>
<td>In order to develop a measurement framework to help achieve the aim of this research, there was a need to review other researchers’ work</td>
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</tbody>
</table>
such as the measurement frameworks and CSFs that are crucial to establish LS. The reviewed literature highlighted many of the CSFs that are required by LS, and the author of this research categorised the important factors into six categories (processes; planning and control; human resources (HR); top management and leadership; customer relations; and supplier relations) in order to identify the general situation within K-SMMIs and see what quality and management practices they are currently using.

| 5. To identify and analyse the different barriers and enablers for implementation of LS in K-SMMIs | The use of mixed methods allowed the researcher to shed light on the barriers (external and internal factors) that are likely to impede K-SMMIs’ adoption of LS. Further, the expert panel showed that K-SMMIs can still adopt and benefit from LS, under the condition that a sense of urgency is created by the government in order to drive these firms to improve. |
7.3 Research questions

In order to achieve the main aims and objectives of this research, six research questions were posed in order to obtain a clear understanding of K-SMMIs and their readiness to adopt LS.

The first RQ was: “How far are K-SMMIs from a lean system?” The answer to this question showed that K-SMMIs are far from LS, their current practices do not support LS, and there are many factors that are affecting their LR, as shown in the outcomes to the questionnaires, case study, observations and expert interviews.

The second RQ was “What factors relating to the quality and management practices inhibit K-SMMIs from adopting LS?”. The answer to this question shows that many factors are affecting K-SMMIs, some of which come from within the firms themselves, while others arise from the external environment. This question was answered by interviewing managers within K-SMMIs, and experts. As mentioned in the previous chapter (Discussion), it was found that all of the quality and management practices, which are categorised as processes; planning and control; customer relations; supplier relations; HR; and top management and leadership are not supportive of LS. The issues include:

- Lack of knowledge about LS in Kuwaiti firms.
- Lack of knowledge about the key issues that are considered important for LS in terms of respect for people, such as rewards, involvement, motivation, empowerment, etc.
- No means by which to solve technical issues, as there are no skilled workers, training programmes, or scientific methods in place to solve problems and improve processes.
- Poor communication between top-level and shop-floor people, for reasons such as language barriers, and mistrust between these levels.
- Language barriers, as well as a lack of quality workers in terms of education and skills.
- Lack of empowerment or real involvement for employees.
- No use of technology by which to communicate between departments.
Failure to follow a clear strategy in terms of involving employees in improving processes, nor in promoting CI.

Lack of top-management support and leadership.

The third question was: “Why has LS not been practised within K-SMMIs to date?” Again, the answer to this question showed that there are many reasons why K-SMMIs have not been practising LS. Some of these answers are related to the firms themselves, while others are highly related to the external environment. To answer this question; interviews were conducted with experts in Kuwait, and managers of K-SMMIs. The issues in this area can be summarised as follows:

- Lack of awareness about LS.
- Lack of skilled workers.
- Lack of knowhow.
- Lack of pressure to adopt LS.
- Lack of required resources to establish LS.

The fourth question was: “What is the urgency for K-SMMIs to adopt LS?”. This is one of the most important questions in this study. The answer clearly suggested that there is no real urgency to adopt LS within Kuwaiti firms yet, due to the reasons explained in the Discussion and Results chapters. Data for this question was obtained by interviewing key managers of K-SMMIs, and experts. The following issues were identified:

- There is no real urgency for Kuwaiti firms to adopt LS, as their customers do not have much knowledge about quality.
- The firms can get contracts without having QI in place.
- There is little competition in the market.
- They firms can gain contracts based on links and nepotism.
- The government does not see the manufacturing sector as making a real contribution to developing the nation’s economy, and this sector is thus largely ignored.

The fifth question in the study was: “What is the level of awareness of LS within K-SMMIs?”. This study mainly focused on LS, so understanding K-SMMIs’ awareness of it was key. From the interviews with the K-SMMIs managers, the case
study (which involved speaking with people at the shop-floor and managerial level), and the interviews with the experts, it was found that the level of awareness is very low, and LS is not very popular in Kuwait, unlike ISO 9000.

Finally, the sixth question of this study was: “What are the potential barriers and enablers for K-SMMIs to adopt LS?” Some of the potential enablers and barriers were identified from the literature, and the interviews with the K-SMMI managers and experts supported those findings.

Kuwait has the resources (such as money and technology) to implement LS, but it is not easy to do so; LS will not be effective unless the government creates a clear strategy to make it work. In the meantime, Kuwaiti firms will not be driven towards adopting LS as there is no real need or pressure. The answer to the final RQ was obtained from the interviews conducted with the K-SMMI managers, and experts who are highly involved in the Kuwaiti government, as well as having great knowledge about the Kuwaiti industrial environment.

7.4 Contribution to the body of knowledge

The contribution of this study to the body of knowledge on LS is expected to be significant. Considering the nonexistence of LS studies within the Kuwaiti context, this study has added a new dimension as it has shown the LR within K-SMMIs and identified the factors that are preventing Kuwaiti firms from being lean. Moreover, there has been a lack of studies regarding LS with an SME context to date, especially in the Arab world where no studies have considered LS within SMEs. This study makes a contribution to the literature on lean in the developing-country context, especially in the Arab world, as Arab countries share many similarities in terms of culture and other traits, and the findings of this study can be used as guidance for other Arab countries.

Furthermore, many researchers (e.g., Nordin et al., 2012a; Radnor et al., 2006) have pointed out the importance of readiness before implementing LS, though there is lack of literature relating to how this readiness can be assessed and measured. This study has addressed this gap by developing an LR framework that organisations can use prior to attempting LS, as it contains most of the lean
requirements that represent the foundation of LS, as extracted from the literature review.

It also contributes to knowledge about the failure of lean implementation. Several researchers (e.g., Balle, 2005; Papadopoulou and Ozbayrak, 2005; Emilliani, 2008) have stated that despite the huge benefits of LS there are a large number of failure stories in relation to lean implementation. To avoid failure, there is a need to understand the organisation’s ability to adopt LS, and to understand the requirements for it; the LR framework developed in this study will enable organisations to evaluate their abilities before attempting LS, and to understand the requirements as the LR framework can be used as a checklist for these.

Finally, due to the diversity of data-collection sources used, this study added new insight to the inhibitors faced by K-SMMIs which may not enable them to implement LS, and addressed the source of those inhibitors.

The contributions of this study can therefore be summarised as follows:

- Firstly, an LR framework does not currently exist in the literature, and the LS and LR measurement framework relating to K-SMMIs presented here thus represents a unique effort in the area of LS.
- Secondly, LS has not been covered within the Kuwaiti context, and no studies have been conducted to date in relation to K-SMMIs.
- Thirdly, most lean studies have been conducted with reference to organisations that have implemented LS already, and the studies have identified the critical factors based on this, leaving out organisations who have not yet started LS and who may want to implement LS in future.
- Fourthly, this study has contributed to the body of knowledge with respect to QI within the Kuwaiti context, which can also be generalised to the GCC region.

7.5 Implications

The LR framework provided here is simple and easy to use, and will allow managers to understand their current practices to see whether they are supportive of LS, or if things need to be addressed before implementation. This will make it
possible for managers to know whether they have the required resources for LS, and also to learn whether they are able to afford these resources. For example, by using the LR framework managers will be able to assess whether they have a tidy workplace, labelled items, TPM, records of cycle times, skilled workers, empowerment, investment funds for training, etc. If managers are not willing to implement these they will have a minimal chance of success in LS, as LS requires most of the aspects mentioned. The framework is not limited to use in Kuwait, as it was derived from different studies around the world, and most of the items are applicable to all types of manufacturing industries.

Moreover, the findings of this research can arguably be generalised to all K-SMMIs, as several interviews were conducted with consultants in Kuwait to identify the reasons why LS implementation has been delayed, which means that a general view of the K-SMMIs was obtained, rather than data only on those visited. Further, as most Arab countries – and, more precisely, those in the GCC region – share similar cultures and values, the results can be generalised to them, bearing in mind that LS requires certain types of cultures, in both an organisational and a national sense.

The findings in this study show that one of the aspects that has prevented K-SMMIs from adopting LS is nepotism and favouritism, alongside other characteristics such as the country’s wealth and high dependence on expatriates; all these issues are applicable to most of the GCC countries, so it is believed that the findings can be applied to other Arab countries, especially GCC countries. Gherbal et al. (2012) found that Libyan industries are adopting ISO 9000 for prestige purposes, not for improvement, which supports the findings of this study. Further, Jaber (2010) found that favouritism is affecting Libyan readiness towards TQM; this can also be understood from a statement made by Bardot (2013, p. 21) regarding the GCC:

GCC countries, despite some local nuances, follow some common characteristics. Most of the population is made of expatriates […] the local nationals often represent a small fraction of the overall population and tend to work in highly paid and prestigious government jobs. The local governments are making efforts to promote the employment of their citizens in the private sector, which is often a challenge due to cultural and financial reasons. Packages, even though under local law, are focused
on cash and built similarly to international assignee packages: basic pay, various allowances from housing to transportation, education or furniture.

Additionally, Bardot (2013) explained that most of the GCC countries are eager to improve and are striving to reach the right solutions, but also do not understand these solutions and do not know how or where to start. LS could be one of the solutions to boost the manufacturing sectors, so the findings of this study can serve as guidance for the GCC countries, especially for small, local organisations and government entities who do not have partnerships with Western companies. As Bardot (2013) suggested, there is a need for intensive education so that GCC countries will accept modern practices.

Furthermore, the LR framework can be applied in any manufacturing industries regardless of location, as it contains key foundational aspects of LS; thus, any firms that want to adopt LS can use the LR framework to assess their readiness and to see whether they will be willing to address the areas in which they are lacking in order to succeed in LS adoption.

7.6 Recommendations

The Kuwaiti government is trying to reduce its reliance on oil and gas, and supporting K-SMMIs could be key to achieving this vision. Thus, in order to ensure the success of LS and to enhance the role of K-SMMIs, the government needs to pay attention to this sector by encouraging firms to adopt LS, and developing awareness campaigns that highlight the importance of LS and explain the requirements for the implementation process. This can be done by providing K-SMMIs with appropriate training and workshops. The findings of this study show the weaknesses of K-SMMIs and the requirements for LS, which can be used by the government to formulate some action points in this direction. One of the main things that need to be done by the government is to create a sense of urgency, and this can be achieved by expanding the market by introducing FDI, which will increase the level of competition. More importantly, the government needs to have transparency in offering governmental projects and contracts, which should be based on quality rather than links, and decrease the number of procedures required for firms to be established or to expand.
With regard to K-SMMIs, they need to educate themselves in LS, as it can help them to manage their resources more efficiently. They should rely on quality labourers, and need to understand the importance of empowerment, CI, involvement, training, and most of the other issues that have been identified in this study. Equally important is the need for them to be aware of the use of essential tools, such as 5s and VM, as these will help them to better manage their processes, which will in turn reflect in their production rate.

7.7 Limitations

The findings of this study are limited in terms of generalisability to K-SMMIs, as the study mainly considered SMMIs in Kuwait, and excluded large firms. Another limitation of this study is the small sample size; the author faced difficulty in convincing a larger number of companies to participate and could not cover the whole manufacturing sector in Kuwait due to a lack of time and interest from many firms, plus the fact that some firms did not fit the criteria (i.e. were not SMMIs). There is also a lack of information and published studies regarding Kuwaiti manufacturing industries; further, there is an absence of research regarding LS within GCC countries, and this meant that it was not possible to compare the findings with those of other researchers. Increasing the sample size would have allowed better and more accurate results to be obtained, and would also have provided more robust results with respect to the t-test and ANOVA.

In this study a semi-structured interview technique was adopted, along with other data collection methods. Semi-structured interviews may lead to bias, however different techniques were employed in order to keep this bias limited. Furthermore, because a survey questionnaire was used in this study, the responses from the respondents might not be completely accurate, as for some participants the subject may not have been of interest, and they may have only completed the survey as a favour, or out of politeness, which would have resulted in misleading answers. By using different techniques, it is believed that an accurate picture of K-SMMIs has been obtained – though this cannot be 100 per cent certain.

Furthermore, two firms were considered for the case study, but the initial idea was to use four (two ISO-accredited, and two non-ISO-accredited firms). Initial
agreement was obtained from four firms, but two firms then withdrew due to time constraints and confidentiality concerns.

Finally, due to time constraints it was not possible to validate the LR framework in SMMIs who have already implemented LS to use as a benchmark.

7.8 Future research

Due to its exploratory and descriptive nature, this study highlights a number of avenues for further empirical research; as a first step, the framework needs to be applied to successful lean SMMIs in order to use it as a valid benchmark. Other suggested avenues for future research include finding out why ISO 9000 has not affected K-SMMIs’ internal processes, and this can be done by investigating the motives behind ISO 9000 adoption, and measuring the effects of ISO 9000 (in terms of quality of product, customer satisfaction, documentation, process improvement, etc.) before and after implementation.

This study has not covered all of the manufacturing sectors within the Kuwaiti context, and it is important to apply it to sectors such as food and beverages; textiles, clothing and leather; wood and wood products; furniture, etc. Increasing the sample size would be another avenue by which to provide more accurate results in the future.

Further, the findings of this study show that there are many external factors inhibiting the full potential of K-SMMIs, and that there is no real urgency for them to adopt LS; thus, conducting studies measuring the readiness towards LS within Kuwaiti service sectors would be good step to see whether the discovered factors are affecting the manufacturing sectors only, or also the service industry.

Furthermore, Arab countries – and more precisely the GCC region – share many values, traditions and cultural aspects with Kuwait, so finding out the LR for firms in these countries would add a great deal of richness to the lean system literature.
References


http://www.oxforddictionaries.com/definition/english/expert

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Radeka, K. (2009). Extreme Toyota: Radical Contradictions that Drive Success at the World's Best Manufacturer by Emi Osono, Norihiko Shimizu, and


MEP. *In the United States Association for Small Business and Entrepreneurship*, (pp. 691-705). San Diego.


http://www.theproductivitypro.com/blog/2012/03/


## Appendix-A Questionnaire items

<table>
<thead>
<tr>
<th>Practices</th>
<th>Item No.</th>
<th>Category</th>
<th>Main source</th>
</tr>
</thead>
<tbody>
<tr>
<td>5s</td>
<td>PR01</td>
<td>The workshop is divided into different workplaces and each zone has a specific task.</td>
<td>6,12,14,16,18,22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellular</td>
<td>PR02</td>
<td>The processes used within similar operations are placed close to each other in order to eliminate unnecessary steps.</td>
<td>6,12,14,16,18,22,46</td>
</tr>
<tr>
<td>Skilled people</td>
<td>PR03</td>
<td>Each working zone is controlled and operated by qualified and well-trained workers.</td>
<td>12,14,16,18</td>
</tr>
<tr>
<td>5s</td>
<td>PR04</td>
<td>Each item/piece of equipment is labelled to ensure it is located in the right zone/location in the workplace.</td>
<td>6,12,14,16,18</td>
</tr>
<tr>
<td>Pull</td>
<td>PR05</td>
<td>Production at each station is pulled by demand from the next station.</td>
<td>12,16,18</td>
</tr>
<tr>
<td>5s and Standardization</td>
<td>PR06</td>
<td>A certain person is assigned as a part of his daily activities to ensure the workplace is clean and all tools/pieces of equipment are put back in their appropriate places.</td>
<td>12,13,14,16,19</td>
</tr>
<tr>
<td>TPM</td>
<td>PR07</td>
<td>Equipment maintenance records are posted on the shop floor to be actively shared with employees.</td>
<td>18,22,47</td>
</tr>
<tr>
<td>Cellular</td>
<td>PR08</td>
<td>The process flow of material and components is smooth and continuous, as the equipment is grouped.</td>
<td>6,12,14,16,18,22,46</td>
</tr>
<tr>
<td>Pull</td>
<td>PR09</td>
<td>Products are not produced unless orders for them are received from customers.</td>
<td>12,16,18</td>
</tr>
<tr>
<td>TPM</td>
<td>PR10</td>
<td>Machine operators and staff are engaged in the scheduled</td>
<td>4,13,16,19,46</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Maintenance of equipment so that machines are maintained on a regular basis by skilled people.</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a well-documented configuration setting for each machine/piece of equipment to avoid uncertainty about how to reconfigure the equipment during changeover.</td>
</tr>
<tr>
<td>The total cycle time is revised for each product on a regular basis in order to reach the optimum level.</td>
</tr>
</tbody>
</table>

### Planning and Control

| Problem solving PC01 | In order to improve production, a focus group of workers is conducted (on a regular basis) to help the company identify wastes and solve problems by generating new ideas and solutions, which are then submitted to the managers. |
| Benchmarking PC02 | There is an awareness of the wider industry performance, and a clear strategy is followed to benchmark performance with the top-class firm (at a domestic and national level). |
| Standardization PC03 | There are standard routes for loading raw materials and removing end products, including a standard picking time. |
| Problem solving PC04 | Problem-solving techniques such as Fishbone diagrams are used to identify the causes of quality problems. |
| VM/KPI PC05 | Up-to-date charts showing defect rates, key performance indicators, progress and next job activity are displayed on the shop floor. |

### Customer Relations

| Customer awareness CUO1 | There is an awareness of what product features customers value and are willing to pay for. |
| Customer CUO2 | Feedback is sought regularly, and surveys/meetings are often held |
### Customer Involvement

<table>
<thead>
<tr>
<th>Customer Involvement</th>
<th>Feedback</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUO3</td>
<td>Feedback</td>
<td>Customers participate in the initial design process.</td>
<td>18,22,43</td>
</tr>
<tr>
<td>CUO4</td>
<td>Customer relationship</td>
<td>Valued customers are brought in to visit the plant in order to give them some ideas about quality control that the company can follow.</td>
<td>7,43</td>
</tr>
<tr>
<td>CUO5</td>
<td>Customer involvement</td>
<td>Customers help the company by providing information about their future demands.</td>
<td>18,43</td>
</tr>
<tr>
<td>CUO6</td>
<td>Customer involvement</td>
<td>There is a system in place for collecting customer complaints so that problems can be avoided in the future.</td>
<td>18</td>
</tr>
</tbody>
</table>

### Supplier Relations

<table>
<thead>
<tr>
<th>Supplier Relation</th>
<th>Supplier Performance</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU01</td>
<td>Quality suppliers</td>
<td>A clear strategy is in place by which to evaluate supplier performance in terms of quality, delivery and prices.</td>
<td>18,22,29,48,49</td>
</tr>
<tr>
<td>SU02</td>
<td>Close suppliers</td>
<td>Local suppliers are used to avoid shipment delays.</td>
<td>3,18,50</td>
</tr>
<tr>
<td>SU03</td>
<td>Supplier involvement</td>
<td>Suppliers are aware of product designs and participate heavily during design and development.</td>
<td>18,22,49</td>
</tr>
<tr>
<td>SU04</td>
<td>Quality suppliers</td>
<td>Raw materials and purchased parts are not subject to incoming inspection as they come from qualified suppliers.</td>
<td>20,29,48,49</td>
</tr>
<tr>
<td>SU05</td>
<td>No. of suppliers</td>
<td>Active steps are taken to reduce the number of suppliers in each category.</td>
<td>18,51,52,53</td>
</tr>
<tr>
<td>SU06</td>
<td>Quality suppliers</td>
<td>Raw materials are received on time from the date of order.</td>
<td>7,20,48,49,50</td>
</tr>
<tr>
<td>SU07</td>
<td>Supplier relation</td>
<td>Suppliers are cooperative and committed to maintaining a long-term relationship.</td>
<td>7,17,18,20,23,48,49</td>
</tr>
<tr>
<td>SU08</td>
<td>Feedback to suppliers</td>
<td>Suppliers are provided with feedback regarding quality and delivery performance.</td>
<td>18</td>
</tr>
<tr>
<td>HR</td>
<td>HR01</td>
<td>Workspace layout is reconfigured regularly based on feedback from employees.</td>
<td>4,18,22,29,46</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Multi-tasking</td>
<td>HR02</td>
<td>Workers are able to perform different tasks</td>
<td>13,14,16,22,23, 24,43,46</td>
</tr>
<tr>
<td>Participation</td>
<td>HR03</td>
<td>Shop-floor employees drive suggestion programme.</td>
<td>18,22,23,29,46</td>
</tr>
<tr>
<td>Motivation</td>
<td>HR04</td>
<td>Numerous awards, incentive programmes and annual bonuses are available for employees who help to improve processes and eliminate unnecessary steps. The evaluation is based on group performance</td>
<td>4,18,22,23,24,25,27</td>
</tr>
<tr>
<td>Skilled people</td>
<td>HR05</td>
<td>Workers are qualified enough to contribute to solving problems, and are able to work as a team.</td>
<td>1,4,12,14,20,24,41</td>
</tr>
<tr>
<td>Communication</td>
<td>HR06</td>
<td>Departmental and employee relations are good, and conflict barely occurs.</td>
<td>6,17,21,23,26,28,33</td>
</tr>
<tr>
<td>Involvement</td>
<td>HR07</td>
<td>Each employee has a clear understanding of his job description.</td>
<td>8,21,23,35,38</td>
</tr>
<tr>
<td>Training</td>
<td>HR08</td>
<td>Employees have undergone quality training in terms of developing their problem-solving capabilities and identifying non-value-adding activities.</td>
<td>3,8,11,18,21,22,24,27, 28,35</td>
</tr>
<tr>
<td>Empowerment</td>
<td>HR09</td>
<td>Workers are empowered to stop the production line if abnormalities occur.</td>
<td>4,16,12,14,23,24,25,26,27,28,29,35,40,43,46</td>
</tr>
<tr>
<td>Participation</td>
<td>HR10</td>
<td>Suggestions and ideas from shop-floor employees are actively used and implemented.</td>
<td>18,22,23,29</td>
</tr>
<tr>
<td>Teamwork</td>
<td>HR11</td>
<td>Employees act according to the interests of the group, rather than their individual interests.</td>
<td>6,17,22,23,29,33,35,43</td>
</tr>
</tbody>
</table>

**Top Management and Leadership**

<table>
<thead>
<tr>
<th>Top Management and Leadership</th>
<th>MGT01</th>
<th>Top management encourages and coaches workers by visiting the</th>
<th>17,21,23,33,39,40,46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Workplace on a regular basis.</td>
<td>MGT02</td>
<td>We locate our worker where they can use their skills, qualifications and experience.</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Knowing people’s capabilities</td>
<td>MGT03</td>
<td>People have job security and workers are regularly promoted to managerial positions.</td>
<td></td>
</tr>
<tr>
<td>Job security</td>
<td>MGT04</td>
<td>Company invests in training programmes and encourages cross-job training.</td>
<td></td>
</tr>
<tr>
<td>Commitment to improvement</td>
<td>MGT05</td>
<td>Company uses external experts/consultants on a regular basis to evaluate the overall company performance and to improve production and quality level.</td>
<td></td>
</tr>
</tbody>
</table>

Appendix-B Survey questionnaire

### Part 1: Company Background Information

<table>
<thead>
<tr>
<th><strong>Company Age (Years)</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td>3-5</td>
<td>5-10</td>
<td>&gt; 10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Type Of Product Produced</strong></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Paper, Paper Product and Printing</td>
<td>Metal Product Machinery and Equipment Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical, Petroleum Product, Coal, Rubber and Plastic Activity</td>
<td>Non Metallic Minerals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>Other (Please Specify)</td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Legal Structure Of Company</strong></th>
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<tbody>
<tr>
<td>Shareholding</td>
<td>Limited Liability</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Ownership Structure</strong></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Family Owned</td>
<td>Non-Family Owned</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Company Size</strong></th>
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</thead>
<tbody>
<tr>
<td>Small (Fewer Than 35 Employees/ Capital 150,000kd Or Less)</td>
<td>Medium (36-70 Employees Or Capital Between 150,000-500,000kd)</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Are You Iso900 Certified Company</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Number Of Suppliers</strong></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td>3-5</td>
<td>&gt; 5</td>
<td></td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Are You Aware About Lean System</strong></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Which Of The Following Quality Practises Your Are Currently Adopting (You Can Choose More Than One)</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Circle</td>
<td>Visual Management</td>
<td>Bench Marking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5s</td>
<td>Other (Please Specify)</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>How Can You Describe Your Organisation Type?</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploitive</td>
<td>Bureaucratic</td>
<td>Consultative</td>
<td>Participative</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------</td>
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<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Male</td>
<td></td>
<td>[ ] Female</td>
<td></td>
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<table>
<thead>
<tr>
<th>Total Years Of Experience</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] &lt;3 Years</td>
<td></td>
<td>[ ] 3-5 Years</td>
</tr>
<tr>
<td>[ ] 5-10</td>
<td></td>
<td>[ ] &gt; 10 Years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years Of Employment In This Company</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] &lt;3 Years</td>
<td></td>
<td>[ ] 3-5 Years</td>
</tr>
<tr>
<td>[ ] 5-10</td>
<td></td>
<td>[ ] &gt; 10 Years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job Position/ Current Title</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] CEO/ Managing Director</td>
<td>[ ] Quality Control Manager</td>
<td></td>
</tr>
<tr>
<td>[ ] Production Manager</td>
<td>[ ] Inventory Manager</td>
<td></td>
</tr>
<tr>
<td>[ ] Supervisor</td>
<td>[ ] Other (Please Specify)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Master’s / PhD</td>
<td>[ ] Bachelor’s Degree</td>
<td></td>
</tr>
<tr>
<td>[ ] High School</td>
<td>[ ] Others (Please Specify)</td>
<td></td>
</tr>
<tr>
<td>Item No.</td>
<td>Process</td>
<td>1</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>PR01</td>
<td>The workshop is divided into different workplaces and each zone has a specific task.</td>
<td></td>
</tr>
<tr>
<td>PR02</td>
<td>The processes used within similar operations are placed close to each other in order to eliminate unnecessary steps.</td>
<td></td>
</tr>
<tr>
<td>PR03</td>
<td>Each working zone is controlled and operated by qualified and well-trained workers.</td>
<td></td>
</tr>
<tr>
<td>PR04</td>
<td>Each item/piece of equipment is labelled to ensure it is located in the right zone/location in the workplace.</td>
<td></td>
</tr>
<tr>
<td>PR05</td>
<td>Production at each station is pulled by demand from the next station.</td>
<td></td>
</tr>
<tr>
<td>PR06</td>
<td>A certain person is assigned as a part of his daily activities to ensure that the workplace is clean and all tools/pieces of equipment are put back in their appropriate places.</td>
<td></td>
</tr>
<tr>
<td>PR07</td>
<td>Equipment maintenance records are posted on the shop floor to be actively shared with employees.</td>
<td></td>
</tr>
<tr>
<td>PR08</td>
<td>The process flow of material and components is smooth and continuous, as the equipment is grouped.</td>
<td></td>
</tr>
<tr>
<td>PR09</td>
<td>Products are not produced unless orders for them are received from customers.</td>
<td></td>
</tr>
<tr>
<td>PR10</td>
<td>Machine operators and staff are engaged in the scheduled maintenance of equipment so that machines are maintained on a regular basis by skilled people.</td>
<td></td>
</tr>
<tr>
<td>PR11</td>
<td>There is a well-documented configuration setting for each machine/piece of equipment to avoid uncertainty about how to reconfigure the equipment during changeover.</td>
<td></td>
</tr>
<tr>
<td>PR12</td>
<td>The total cycle time is revised for each product on a regular basis in order to reach the optimum level.</td>
<td></td>
</tr>
</tbody>
</table>
Please use the following scales

1= Never, 2= Very Rarely, 3= Sometimes, 4= Frequently and 5= Always

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>Planning and Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC01</td>
<td>In order to improve production, a focus group of workers is conducted (on a regular basis) to help the company identify wastes and solve problems by generating new ideas and solutions, which are then submitted to the managers.</td>
</tr>
<tr>
<td>PC02</td>
<td>There is an awareness of the wider industry performance, and a clear strategy is followed to benchmark performance with the top-class firm (at a domestic and national level).</td>
</tr>
<tr>
<td>PC03</td>
<td>There are standard routes for loading raw materials and removing end products, including a standard picking time.</td>
</tr>
<tr>
<td>PC04</td>
<td>Problem-solving techniques such as fishbone diagrams are used to identify the causes of quality problems.</td>
</tr>
<tr>
<td>PC05</td>
<td>Up-to-date charts showing defect rates, key performance indicators, progress and next job activity are displayed on the shop floor.</td>
</tr>
</tbody>
</table>

Please use the following scales

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Customer relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU01</td>
<td>There is an awareness of what product features customers value and are willing to pay for.</td>
</tr>
<tr>
<td>CU02</td>
<td>Feedback is sought regularly, and surveys/meetings are often held with customers to improve product design and quality, and service.</td>
</tr>
<tr>
<td>CU03</td>
<td>Customers participate in the initial design process.</td>
</tr>
<tr>
<td>CU04</td>
<td>Valued customers are brought in to visit the plant in order to give them some ideas about quality control that the company can follow.</td>
</tr>
<tr>
<td>CU05</td>
<td>Customers help the company by providing information about their future demands.</td>
</tr>
</tbody>
</table>
CU06 | There is a system in place for collecting customer complaints so that problems can be avoided in the future.

Please use the following scales
1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Supplier relations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU01</td>
<td>A clear strategy is in place by which to evaluate supplier performance in terms of quality, delivery and prices.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU02</td>
<td>Local suppliers are used to avoid shipment delays.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU03</td>
<td>Suppliers are aware of product designs and participate heavily during design and development.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU04</td>
<td>Raw materials and purchased parts are not subject to incoming inspection as they come from qualified suppliers.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU05</td>
<td>Active steps are taken to reduce the number of suppliers in each category.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU06</td>
<td>Raw materials are received on time from the date of order.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU07</td>
<td>Suppliers are cooperative and committed to maintaining a long-term relationship.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SU08</td>
<td>Suppliers are provided with feedback regarding quality and delivery performance.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Please use the following scales
1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

<table>
<thead>
<tr>
<th>Items No.</th>
<th>HR</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR01</td>
<td>Workspace layout is reconfigured regularly based on feedback from employees.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>HR02</td>
<td>Workers are able to perform different tasks</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>HR03</td>
<td>Shop-floor employees drive suggestion programme.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Numerous awards, incentive programmes and annual bonuses are available for employees who help to improve processes and eliminate unnecessary steps. The evaluation is based on group performance.

Workers are qualified enough to contribute to solving problems, and are able to work as a team.

Departmental and employee relations are good, and conflict barely occurs.

Each employee has a clear understanding of his job description.

Employees have undergone quality training in terms of developing their problem-solving capabilities and identifying non-value-adding activities.

Workers are empowered to stop the production line if abnormalities occur.

Suggestions and ideas from shop-floor employees are actively used and implemented.

Employees act according to the interests of the group, rather than their individual interests.

Please use the following scales
1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Top Management and Leadership</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT01</td>
<td>Top management encourages and coaches workers by visiting the workplace on a regular basis.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MGT02</td>
<td>We locate our worker where they can use their skills, qualifications and experience.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MGT03</td>
<td>People have job security and workers are regularly promoted to managerial positions.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MGT04</td>
<td>Company invests in training programmes and encourages cross-job training.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MGT05</td>
<td>Company uses external experts/consultants on a regular basis to evaluate the overall company performance and to improve production and quality level.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Appendix-C Ethics statement checklist

FORM UPR16
Research Ethics Review Checklist

Please complete and return the form to Research Section, Quality Management Division, Academic Registry, University House, with your thesis, prior to examination.

Postgraduate Research Student (PGRS) Information
Student ID: 146792

Student Name: Mohamad AL-Najem

Department: School of Engineering, MDE
First Supervisor: Dr Hom Dhakal

Start Date: October 2009
(or progression date for Prof Doc students)

Study Mode and Route:
- Part-time
- Full-time
- MPhil
- MD
- PhD
- Integrated Doctorate
- New Route
- Prof Doc (PD)

Title of Thesis: Critical issues affecting the lean readiness level within Kuwaiti small and medium sized manufacturing industries

Thesis Word Count: 116571
(excluding ancillary data)

If you are unsure about any of the following, please contact the local representative on your Faculty Ethics Committee for advice. Please note that it is your responsibility to follow the University’s Ethics Policy and any relevant University, academic or professional guidelines in the conduct of your study.

Although the Ethics Committee may have given your study a favourable opinion, the final responsibility for the ethical conduct of this work lies with the researcher(s).

UKRIRO Finished Research Checklist:
(If you would like to know more about the checklist, please see your Faculty or Departmental Ethics Committee rep or see the online version of the full checklist at: http://www.ukri.org/what-we-do/code-of-practice-for-research)

a) Have all of your research and findings been reported accurately, honestly and within a reasonable time frame? YES

b) Have all contributions to knowledge been acknowledged? YES

c) Have you complied with all agreements relating to intellectual property, publication and authorship? YES

d) Has your research data been retained in a secure and accessible form and will it remain so for the required duration? YES

e) Does your research comply with all legal, ethical, and contractual requirements? YES

*Delete as appropriate
**Student Statement:**

I have considered the ethical dimensions of the above named research project, and have successfully obtained the necessary ethical approval(s)

<table>
<thead>
<tr>
<th>Ethical review number(s) from Faculty Ethics Committee (or from NRES/SCREC):</th>
<th>7B0B-812A-FE31-66D2-B7BE-92E1-CFB8-7B1C</th>
</tr>
</thead>
</table>

**Signed:**

<table>
<thead>
<tr>
<th>Date: 25/9/2013</th>
</tr>
</thead>
</table>

If you have **not** submitted your work for ethical review, and/or you have answered 'No' to one or more of questions a) to e), please explain why this is so:

| Signed: |
| Date: 25/9/2013 |
Appendix-D Ethical review certificate

Certificate of Fast Track Ethics Review

<table>
<thead>
<tr>
<th>Project Title:</th>
<th>Critical issues for lean implementation within Kuwaiti SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Number:</td>
<td>146792</td>
</tr>
<tr>
<td>Application Date:</td>
<td>23/05/2013 19:21:27</td>
</tr>
</tbody>
</table>

You must download your referral certificate, print a copy and keep it as a record of this review.

The FEC representative for the School of Engineering is Giles Tewkesbury

It is your responsibility to follow the University Code of Practice on Ethical Standards and any Department/School or professional guidelines in the conduct of your study including relevant guidelines regarding health and safety of researchers including the following:

- University Policy
- Safety on Geological Fieldwork

It is also your responsibility to follow University guidance on Data Protection Policy:

- General guidance for all data protection issues
- University Data Protection Policy

Project Title:
Critical issues for lean implementation within Kuwaiti SMEs

School Or Department:
ENG

Primary Role:
Postgraduate Student

Supervisor Name:
Dr Hom Dhakal

Human Participants:
No

Physical Ecological Damage:
No

Historical Or Cultural Damage:
No

Harm To Animal:
No

Harmful To Third Parties:
No

Certificate Code: 7B0B-912A-EF31-68D2-B78E-92E1-CFB0-781C

Supervisor Review

Supervisor signature: [Signature]

Date: 23-05-13

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