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SCHOOL OF AEROSPACE, TRANSPORT AND
MANUFACTURING (SATM)

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Doctorate of Philosophy Thesis
Academic Year: 2014 - 2018

Supervisor: Patrick McLaughlin
July 2018

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DEVELOP A FRAMEWORK TO IMPROVE LEAN
IMPLEMENTATION BY LEVERAGING ORGANIZATIONAL
CULTURE WITHIN SMALL AND MEDIUM MANUFACTURING
SECTOR: THE CASE OF SAUDI ARABIA

Supervisor: Patrick McLaughlin
July 2018

This thesis is submitted in partial fulfilment of the requirements for
the degree of PhD

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LIST OF PUBLICATIONS

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- Alkhoraif, A. and McLaughlin, P. (2017) 'Organisational culture - enablers and inhibitorsfactors for the effective implementation of lean" International Journal of Lean Thinking, 8(2).
- Alkhoraif, A. and McLaughlin, P. (2017) 'Organizational culture aspects that facilitate Lean Implementation: A Pilot Study" *International Journal of Agile Systems and Management* , DOI: 10.1504/IJASM.2018.10012787.
- Alkhoraif, A. and McLaughlin, P. (2018) 'Lean implementation within manufacturing SMEs in Saudi Arabia: Organizational culture aspects" Journal of King Saud University - Engineering Sciences. doi.org/10.1016/j.jksues.2018.04.002
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ABSTRACT

Implementing Lean into manufacturing small and medium enterprises faces difficulties, whereas it is more likely to be implemented successfully in larger companies, which then gain the advantages of Lean systems (Karim et al., 2011, Pakdil and Leonard, 2015). In addition, Organizational culture is one of the most important factors to focus on to facilitate the implementation of Lean within Saudi Arabian manufacturing (Karim and Arif-Uz-Zaman, 2013). Thus, more research that focuses on Lean implementation in SMEs are needed. This article focuses on contributing to develop a framework to improve Lean Implementation into small and medium enterprise manufacturing organisations in Saudi Arabia by leveraging aspects of Organizational Culture. Qualitative research is confirmed to be useful for uncovering such insider views, (Corbin and Strauss, 1990). The thesis will be based on qualitative and grounded theory inside action research with and an inductive approach. Action research tends to be used for prompting conscious change within a somewhat controlled environment, (Collis and Hussey, 2013). The data collection generally employed to study culture consist of; semi structured interviews, observation and focus groups. A framework by identifying suitable interventions to facilitate lean culture. a series of interventions developed with participants. these interventions permitted a framework for SMEs to be developed. A plan of linked interventions designed to develop aspects of lean culture forms the output of phase three. The planned interventions for SMEs are should take place together as a series of interlinked interventions. The interventions come from two sources literature review and data gathering. The contributions of this study are threefold: First, there has been no previous framework of Lean implementation in SMEs manufacturing sector. In addition, It also contributes to knowledge about the failure of lean implementation. Concerning aspects of organizational culture that facilitate lean implementation. This knowledge is transdisciplinary and adds to the domains of lean implementation, organizational culture and lean culture Finally, it supports the academic society with scheme for proposal future research.

Keywords:

Organizational Culture (OC); Lean implementation (LI); King of Saudi Arabia (KSA), Small and Medium Enterprises (SMES)

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TABLE OF CONTENTS

LIST OF PUBLICATIONS.....	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS.....	i
LIST OF FIGURES.....	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS.....	ix
1 Chapter 1: Intorduction.....	11
1.1 Research background.....	11
1.2 Research problem statement and motivation.....	12
1.3 Research context.....	13
1.4 Aim.....	14
1.5 Objectives	14
1.6 Research questions	15
1.7 Contribution to the knowledge	15
1.8 Overview of the Research Methodology	16
1.9 Thesis structure	18
2 Chapter 2: Literature review	21
2.1 Section 1: Lean philosophy.....	22
2.1.1 Introduction	22
2.1.2 An overview of Lean.....	24
2.1.3 Overview of SMEs.....	28
2.1.4 A methodology for conducting a literature review.....	32
2.1.5 Findings - Section one - Descriptive analysis.....	37
2.1.6 Findings - Section two – Categorization analysis	41
2.1.7 Is the size of the SME an enabler or inhibitor of Lean implementation?.....	54
2.1.8 Small and Medium Enterprise Lean practice	60
2.1.9 Small and Medium Enterprise Lean research	61
2.1.10 Organizational culture challenges in Lean manufacturing implementation.....	63
2.1.11 Summary.....	65
2.2 Section 2: Organizational culture	68
2.2.1 Culture.....	68
2.2.2 National culture	68
2.2.3 National culture influence on organizational culture	69
2.2.4 Organizational culture	70
2.2.5 Models of organizational culture.....	72
2.2.6 Assessing culture	78
2.2.7 Organizational culture and Lean management.....	81
2.2.8 Change organizational culture.....	82

2.2.9 Organizational culture enablers and inhibits in Lean implementation.....	86
2.2.10 Summary.....	92
2.3 Section 3: The Saudi arabia context.....	93
2.3.1 The Saudi Arabia context.....	93
2.3.2 Government Systems.....	94
2.3.3 Saudi Arbia Culture.....	95
2.3.4 Lean implementation in Saudi Arbia.....	96
2.3.5 Summary.....	98
2.4 Conclusion.....	99
3 Chapter 3: Methodology.....	102
3.1 Introduction.....	102
3.2 Organizational Culture and Research Issues.....	102
3.3 Conceptual framework.....	104
3.4 Research philosophy.....	105
3.4.1 Ontology.....	108
3.4.2 Epistemology.....	110
3.4.3 Constructivist Method of Inquiry.....	110
3.5 Research approach.....	111
3.6 Research Design.....	112
3.7 Research Methodologies.....	115
3.7.1 Case Study.....	115
3.7.2 Ethnography.....	116
3.7.3 Cognitive mapping.....	117
3.7.4 Action research.....	118
3.7.5 Phenomenology.....	119
3.7.6 Grounded theory.....	119
3.7.7 Laddering: making sense of meaning.....	121
3.8 Methodology chosen for the research.....	121
3.9 Data gathering methods.....	125
3.9.1 Issue-focused investigation.....	125
3.9.2 Phenomenological orientation.....	127
3.9.3 The combination of Issue Focus and phenomenological orientation.....	128
3.10 Building a theory.....	128
3.11 Data collection.....	129
3.11.1 The use of Literature review.....	130
3.11.2 Interviews.....	130
3.11.3 Observations.....	131
3.11.4 Focus groups.....	132
3.12 Data Analysis.....	133
3.12.1 Simultaneous and concurrent data collection.....	133

3.12.2 Constant comparison method	134
3.12.3 Content analysis.....	134
3.12.4 Coding procedures	135
3.12.5 Paradigm model	138
3.13 Rigour in the research.....	139
3.13.1 Credibility	141
3.13.2 Transferability.....	142
3.13.3 Dependability	142
3.13.4 Confirmability	143
3.13.5 Respondent Validation	143
3.13.6 Triangulation	144
3.13.7 Inter-rater reliability.....	145
3.13.8 Validating translation	148
3.14 Framework validation.....	148
3.15 Research Process Phase	148
3.15.1 Phase One	150
3.15.1 Phase Two	151
3.15.1 Phase Three.....	152
3.16 Framework development	152
3.17 Ethics consideration.....	153
3.18 Chapter summary	154
4 Chapter 4: Data gathering and analysis	155
4.1 Introduction	155
4.2 Phase 1: Pilot study	156
4.2.1 Data sampling	156
4.2.2 Data collection.....	157
4.2.3 Findings.....	158
4.2.4 Constant comparison	160
4.3 Main study of the research.....	162
4.3.1 Selection of the study	162
4.3.2 Data collection.....	163
4.3.4 Inter-rate reliability result	168
4.3.5 Emergence of themes influencing Lean culture	169
4.3.6 Analysis.....	173
4.3.7 Phase 2: Questionnaire for gauging current perception of participants.....	208
4.4 Chapter summary	211
5 Chapter 5: Construction of framework development	213
5.1 Introduction	213
5.2 Phase 3: Interventions developed from data gathering.....	214
5.3 Interventions developed from literature review	220
5.4 Framework development	237

5.5 Framework validation.....	250
5.6 Experts' backgrounds	250
5.7 Key findings	251
5.8 Summary of expert's comments	255
5.9 Chapter summary	258
6 Chapter 6: Discussion	259
6.1 Introduction	259
6.2 Framework development	259
6.3 Making the change.....	272
6.4 Chapter summary	276
7 Chapter 7: Conclusion.....	278
7.1 Review of the research questions.....	279
7.2 Contribution to the knowledge	280
7.3 Recommendation.....	282
7.4 Practitioner contribution	283
7.5 Limitation of the research.....	286
7.6 Future research	288
References	290
APPENDICES	356
Appendix A Translation of interviews	356
Appendix B : Research Ethics System.....	362
Appendix C : Approved by Oil Company to conduct interviews	363
Appendix D : Questionnaire scoring sheet.....	364
Appendix E Focus group protocol.....	365
Appendix F Interview questions	366

LIST OF FIGURES

Figure 1-1 Thesis structure	20
Figure 2-1 Methodology stage source: (by author).....	37
Figure 2-2 Research method percentage of papers source: (by author).....	38
Figure 2-3 Distribution of author profile source: (by author).....	39
Figure 2-4 Geographic area percentage of papers source: (by author)	40
Figure 2-5 Geographic map source: (by author).....	41
Figure 2-6 Congruence Model	73
Figure 2-7 Schein's Three Levels of Culture – Visible and invisible interactions (Source: Schein, 1984, p. 4)	74
Figure 2-8 Sociability and solidarity model.....	75
Figure 2-9 Competing Values Framework.....	76
Figure 2-10 Cultural Web.....	78
Figure 2-11 Trompenaars Cultural Dimensions.....	80
Figure 2-12 The KSA map (source: Tang et al., 2018).....	94
Figure 3-1 The Cultural iceberg model. Adopted from (Sackmann, 2006).....	104
Figure 3-2 Schein's model of organizational culture.....	105
Figure 3-3 philosophical methodological process for current research (source: by author).....	108
Figure 3-4 Deductive approach.....	111
Figure 3-5 Inductive approach	112
Figure 3-6 Paradigm Model Adopted from Strauss and Carbon, (1990, p.99) and Creswell (2007, p.293).....	138
Figure 3-7 Research Process Phases (source: by researcher)	149
Figure 4-1 structure of chapter 4.....	155
Figure 4-2 Overall of themes (source: by author)	172
Figure 4-3 The frequency of aspects quoted 2 (source: by author)	175
Figure 4-4 Representation of themes in Schein's model	198
Figure 4-5 Result from Organizational Culture assessment scoring sheet (source: by author).....	210
Figure 5-1 Phase three (source: by author).....	213
Figure 5-2 Validation process (source: by author).....	250

LIST OF TABLES

Table 2-1 SMEs definitions in different countries source: (by author).....	30
Table 2-2 Paper selection criteria source: (by author).....	34
Table 2-3 Keyword search source: (by author).....	35
Table 2-4 Lean implementation process source: (by author).....	42
Table 2-5 The key main tools used in SMEs source: (by author)	43
Table 2-6 Supporting approaches for implementation of Lean, source: (by author)	45
Table 2-7 Critical for estimate the impact of Lean on SMEs , source: (by author)	48
Table 2-8 Summary of CSF source: (by author)	52
Table 2-9 Enablers and inhibitors for SMEs source: (by author) ...	58
Table 2-10 OC impotent factor for successful LI, source: (by author)	65
Table 2-11 Lean Implementation Enablers.....	90
Table 2-12 Lean Implementation Inhibitors	91
Table 3-1 Methodological Philosophical Options.....	106
Table 3-2 Characteristics of Qualitative and Quantitative Research	113
Table 3-3 Characteristic of Case Study and Grounded Theory	116
Table 3-4 Strauss and Corbin Axial Coding (Source: Strauss and Corbin, 1990)	137
Table 3-5 Criteria for ensuring rigour in qualitative research (Liamputtong, 2009)	141
Table 3-6. Distribution of subjects (Gwet, 2002; adapted from Rashed, (2010)	146
Table 3-7. The degree agreement between the raters (Huddleston 2003; Rashed, 2010).....	147
Table 3-8. Percentage level of agreement between the raters (Huddleston 2003; Rashed, 2010).....	147
Table 4-1 Organisations sampled in the pilot study (source: by author)	157
Table 4-2 Data Sample for Pilot Study (source: by author)	158

Table 4-3 Pilot Study Interview aspects and recurrent aspects (source: by author)	160
Table 4-4 SME Data Sample in Saudi Arabia Manufacturing (source: by author)	163
Table 4-5 Interview with the employees from interviews (source: by author)	164
Table 4-6 Duration of interview and pages number (source: by author)	165
Table 4-7 Aspects which influences Lean implementation. (source: by author)	166
Table 4-8 Inter-rate reliability result (source: by author)	168
Table 4-9 Themes developed (source: by author)	170
Table 4-10 The frequency of aspects quoted (source: by author)	174
Table 4-11 Typologies and indicators of resistance (Canning and Found, 2015)	190
Table 4-12 Ideal position for literature review and data gathering (source: by author)	205
Table 4-13 Organizational Culture assessment scoring result (source: by author)	209
Table 5-1 Interventions suggested by participants (source: by author)	219
Table 5-2 interventions identified from literature (source: by author)	235
Table 5-3 Proposed interventions for SMEs (source: by author)	245
Table 5-4 interventions and desired culture related to the seven themes (source: by author)	248
Table 5-5 Experts judgment (source: by author)	250
Table 5-6 Expert's review (source: by author)	256
Table 5-7 Final version of the framework (source: by author)	257
Table 7-1 Research objectives (source: by author)	279
Table 7-2 Research question and review informed from the research (source: by author)	280
Table 7-3 Sub-questions and review informed from the research (source: by author)	280
Table 7-4 Contributions of the research (source: by author)	285

LIST OF ABBREVIATIONS

5S	SORT,SET IN ORDER,SHINE,STANDARDISE AND SUSTAIN
ABC	ACTIVITY-BASED COSTING
CAD/CAM	COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING
CEO	CHIEF EXECUTIVE OFFICER
CI	CONTINUOUS IMPROVEMENT
CSFs	CRITICAL SUCCESS FACTORS
CSR	CORPORATION SOCIAL RESPONSIBILITY
EC	EUROPEAN COMMISSION
ERP	ENTERPRISE RESOURCE PLANNING
GCC	GULF COOPERATION COUNCIL
HR	HUMAN RESOURCE
HRM	HUMAN RESOURCE MANAGEMENT
IBM	INTERNATIONA BUSINESS MACHINES COPORATION
IT	INFORMATION TECHNOLOGY
JIT	JUST IN TIME
KSA	KINGDOM OF SAUDI ARABIA
LC	LEAN CULTURE
LEs	LARGE ENTERPRISES
LI	LEAN IMPLEMENTATION
LSS	LEAN SIX SIGMA
MENA	MIDDLE EAST AND NORTH AFRICA
MODON	SAUDI INDUSTRIAL PROPERTY AUTHORITY
MRP	MATERIALS REQUIREMENT PLANNING
NUMMI	NEW UNION MOTOR MANUFACTURING INC.
OC	ORGANIZATIONAL CULTURE
QFT	QUALITY FUNCTION DEPLOYMENT
QI	QUALITY INITIATIVE
SMED	SINGLE MINUTES EXCHANGE OF DIES
SMEs	SMALL AND MEDIUM ENTERPRISES
TOC	THEORY OF CONSTRAINTS

TPM	TOTAL PRODUCTIVE MAINTENANCE
TPS	TOTAL PRODUCTION SYSTEM
TQM	TOTAL QUALITY MANAHEMENT
USA	UNITED STATES OF AMERICA
VSM	VALUE STREAM MAP

1 Chapter 1: Introduction

1.1 Research background

The aim of Lean manufacturing implementation is that company resources should all be channelled in ways that ultimately create value for the end user,(Schouteten and Benders, 2004). In essence it works towards the goal of maintaining value while doing less work and at the heart is achieving greater efficiency,(Schouteten and Benders, 2004). The definition of Lean provided by (Corbett, 2007) The Lean approach percolates into ever wider circles of operations, it ceases to be about the best practice and starts to become a part of the fabric of doing business, emphasises on Lean as an integral part of the entire organisation, essentially pointing to Lean as being considered more of a philosophy than just a tool or process. This is further supported by Womack and Jones, (2003) who suggest that Lean is becoming understood as more than just production, but an all-encompassing business ideology which incorporates all aspects of value streams as opposed to individual production processes. According to Bhamu and Singh Sangwan, (2014) Lean provides a methodology by which organisations can significantly improve their responsiveness to customers while decreasing and managing costs and waste in supply and operational procedures. However, Organizational culture has its impact on company performance because it impacts on the actions and behaviors, (Calori and Sarnin, 1991; Achanga *et al.*, 2006, 2012; Albliwi *et al.*, 2017; Moradlou and Perera, 2017; Alkhoraif and McLaughlin, 2018a, 2018c). There is a scarcity of research about cultural aspects and organizational culture related to Lean Implementation (LI) (Pakdil and Leonard 2015). This research was designed for SMEs, but it was built at a generic scale to suit other cases as well. The research had as few size constraints as possible, and to create it there was a need to discover as many inhibiting factors as possible. These inhibiting factors, and indeed those factors that encourage this behaviour could be graphically displayed and tabulated, allowing deeper analysis of each, to find its roots and, where necessary, remove it from the company culture (Hietschold *et al.*, 2014).

1.2 Research problem statement and motivation

The research problem in this research is that Lean implementation in small and medium manufacturing enterprises faces difficulties, whereas it is more likely to be implemented successfully in larger companies, which then gain the advantages of lean systems (Karim *et al.*, 2011). Moreover, the culture of an organisation plays a vital role for managers facing the challenge of changing that culture (Graham-jones and Muhareb, 2015). It is necessary to have a feasible lean framework to assist SMEs to successfully implement lean principles (Pingyu and Yu, 2010). For the purpose of this paper SMEs refer to organisations with fewer than 250 employees, a definition adopted by the European Commission (EC, 2011) .

In addition, the motivation of the research:

1. Organisational culture is one of the critical factors that determine the success of lean implementation within SMEs (Achanga *et al.*, 2006).
2. The success of lean implementation will not just be based on applications, tools and techniques but also on top management's involvement, leadership and organisational culture (Jadhav *et al.*, 2014).
3. Culture is the key factor to making the changes for lean implementation (Pakdil and Leonard, 2015a).
4. Lack of research regarding the critical factor of organisational culture related to lean implementation (Pakdil and Leonard, 2015a).
5. Lack of knowledge as well as difficulties in lean implementation in Middle Eastern and Gulf countries, but also increasing concern about the need for lean implementation in SMEs (Al-najem, 2014).
6. Focusing on sustaining lean Implementation is much more demanding than cost reduction (Gupta, Sharma and Sunder M., 2016).
7. There is a clear dearth of research into lean implementation for SMEs in developing countries (Hu, Mason, Sharon J. Williams, *et al.*, 2015).
8. Organisational culture contributes to a successful implementation of lean initiatives and sustainable, proactive improvement is their main enablers (Rymaszewska, 2017).

9. Future research is needed to develop a framework to facilitate lean implementation by leveraging aspects of organizational culture for SMEs manufacturing sector (Alkhoraif and McLaughlin, 2018a)

1.3 Research context

This research is exploring the enablers and inhibitors of Lean implementation adopting in SMEs manufacturing sector in Saudi Arabia by leveraging aspects of organisational culture. This research was funded by the Saudi Arabian government as a part of its 'Vision to 2030' to improve and find quality solutions for SME manufacturing firms to develop, compete and increase SMEs contribution to GDP from 20% to 60%, (Saudi Government, 2015). In addition, it wished to increase the private sector's contribution from 40% to 65% of GDP by raising the share of non-oil exports in non-oil GDP from 16% to 50% (ibid). It is important to clarify that the GDP of Saudi Arabia was estimated at SR608 billion in 2015-2016 (\$162.133 billion USD) (Saudi Arabia Ministry of Finance, 2015).

In a country such as Saudi Arabia, SMEs firms face more challenging difficulties regarding lean implementation (Karim *et al.*, 2011). Saudi Arabia's economy has depended on oil and gas resources, forcing the government to find new non-oil sources of revenue. According to the IMF (Alshahrani and Alsadiq, 2014), the Kingdom of Saudi Arabia is regarded as a dominant economic force within the Middle East and North Africa region (MENA).

According to MODON (Saudi Industrial Property Authority, 2015), the Saudi Government has set up development clusters in various regions of the Kingdom and right now manages over than 32 in underdeveloped cites . In addition, there are additional cites under planning and design, such that the number of the industrial cites should reach 40 with more than 160 million square meters of developed industrial lands. There are more than 3,000 factories in the existing industrial sites with investments exceeding 250 billion riyals, and more than 300,000 employees. Moreover, 2000 factories will be built for SMEs. The goal is to increase the private sector's contribution from 40% to 65% of GDP, raising the share of non-oil exports in non-oil GDP from 16% to 50% (Saudi Government, 2015).

It had come to the knowledge of this researcher during his career and studies that lean implementation, especially among SMEs in Saudi Arabia, had been highly unsuccessful (Karim *et al.*, 2011; Zargun and Al-Ashaab, 2013; Al-najem, 2014; Albliwi *et al.*, 2017). Organisational culture is one of the most important factors to focus on to facilitate lean implementation within Saudi Arabian manufacturing (Karim and Arif-Uz-Zaman, 2013). The main aim of this research was therefore to develop an lean culture framework to facilitate lean implementation before adopting the lean system. According to Karim *et al.* (2011), the most important factor that affects the implementation of the lean system is the organisation's culture. It has been observed that the appropriate lean culture enhances the pace of the growth and keeps the firm competitive (Pooyan *et al.*, 2014).

1.4 Aim

To develop a framework to improve lean implementation into small and medium enterprise manufacturing organisations in Saudi Arabia by leveraging aspects of organisational culture.

1.5 Objectives

The objectives of this project are:

1. To analyse organisational culture enablers and inhibitors of lean implementation through a literature review.
2. To investigate, via a field study, the organisational culture enablers and inhibitors for lean implementation in Saudi Arabian SMEs in the manufacturing sector.
3. Combined literature and empirical data to develop a framework to improve lean implementation within SMEs manufacturing sector in Saudi Arabia by focus on organisational culture aspects.
4. To validate the developed framework.

The framework was designed for SMEs but was built at a generic scale to suit other cases as well. The framework had as few size constraints as possible, and to create it there was a need to discover as many inhibiting factors as

possible. These inhibiting factors, and indeed those factors that encourage this behaviour were graphically displayed and tabulated, allowing deeper analysis of each, to find its roots and, where necessary, remove it from the company culture (Hietschold et al.,2014)

1.6 Research questions

The research question was formulated as 'What aspects of organisational culture facilitate lean implementation in manufacturing small and medium enterprises and how can these aspects be leveraged to improve lean implementation?'

The research question is broken down into the following sub-questions:

1. What are the organisational culture enablers and inhibitors to lean implementation in small- and medium-sized manufacturing firms?
2. What are the perceptions of SME employees and their extant position of the company's culture for encouraging Lean Implementation in KSA?
3. What are the interventions of organisational culture that can improve lean adoption in the Kingdom of Saudi Arabia (KSA)?
4. What are the characteristics of a framework that can improve Lean adopting Organizational culture in KSA?

1.7 Contribution to the knowledge

The contributions of this study are threefold: First, to identified the CSFs of lean implementation in SMEs. Secondly, It demonstrates the current state of LI in manufacturing companies by uncovering the enablers and inhibitors of organisational culture in KSA. Secondly, there has been no previous framework of Lean implementation in SMEs manufacturing sector. In addition, It also contributes to knowledge about the failure of lean implementation. Concerning aspects of organizational culture that facilitate lean implementation. This knowledge is transdisciplinary and adds to the domains of lean implementation, organizational culture and lean culture Finally, it supports the academic society with scheme for proposal future research.

1.8 Overview of the Research Methodology

In conducting research, McCallin (2003) recommends reviewing the philosophical background and considering the paradigm of inquiry, early in the research process. A paradigm is defined as “the basic belief system or worldview that guides the investigator, not only in choices of method, also in ontologically and epistemologically fundamental ways” (Guba and Lincoln, 1994, p. 105).

The definition of research paradigms requires the consideration of ontology, epistemology and methodology. Ontology: is concerned with the form and nature of reality, a theory of what exists and how it exists. Epistemology is concerned with the nature of knowledge and considers the relationship between the knower and what can be known (Guba and Lincoln, 1994).

The researcher must select a research paradigm appropriate to their beliefs about the nature of the fact (Mills, Bonner 2008). According to Guba and Lincoln (1994) human behaviour cannot be understood without identifying to the meanings and purposes attached by human actors to their actions.

The philosophical paradigm applied to this research is Interpretive. The ontological perspective in this research is that many truths may exist but it is essentially created from within the context of individuals in a group. Epistemological perspective employed in this research can be defined as describing a phenomena or trends which occurs in a society or environment,(Easterby-Smith, at al. 2012)). In this case the phenomena or trends occurring refer to the aspects of organisational culture which either promote or hinder lean management in manufacturing. Furthermore, the theoretical perspective utilised is Interpretivism suggesting that the reality needs to be interpreted within their environmental context and thus the methodological approach selected is Grounded theory and a participative action research approach.

Grounded theory which is highly qualitative. Positivism on the other hand tends to favor more quantitative research and hypothesis testing which is not the case

for this research. The option to consider ethnography is not entirely suitable whilst culture is a main subject matter it is more applicable to consider the social processes and interactions of the players as grounded theory enables. This is particularly relevant when needing to research and create a framework for the research topic which relies heavily on the interactions of employees within a specific culture. As a methodology, grounded theory was first presented in the seminal text “The Discovery of Grounded Theory” (Glaser, et al, 1968). The main aim of grounded theory is to produce formal, substantive theory about the behavioural patterns that shape social processes as people interact together in groups (McCallin, 2003). A broader perspective has been proposed by Punch (2009), arguing that grounded theory is neither a theory nor a methodology. Grounded theory, it is argued:

“...is not a theory at all. It is a method, an approach, a strategy. Grounded theory is a research strategy whose purpose is to generate theory from data. ‘Grounded’ means that the theory will be generated on the basis of data.... ‘Theory’ means that the objective of collecting and analysing the research data is to generate theory to explain the data.”
(Punch, 2009, p. 130)

It does this through a procedure of information selection that is often described as inductive in nature (Mills, Bonner et al. 2008). Inductive research “involves the search for pattern from observation and the development of explanations – theories – for those patterns through series of hypotheses” (Bernard, 2011, p.7). Inductive approach starts with the observations and theories are formulated towards the end of the research and as a result of observations (Goddard and Melville, 2004).

At this stage, to better understand the behaviour of the human, Grounded theory and the inductive approach are most appropriate for this research for the following reasons:

- To understand human behaviour (Guba and Lincoln, 1994). Grounded theory provides flexibility when researching social phenomena, which is relevant to understanding the interactions of employees within an organisational culture and implementation of lean, (Charmaz, et al., 2003)
- Furthermore, it better enables justification when using qualitative research in order to construct theoretical analysis and frameworks (Goulding, 1998).
- To produce formal, substantive theory about the behavioural patterns that shape social processes as people interact together in groups (McCallin, 2003).
- Grounded theory generally begins with an inductive approach as they are considered to work hand in hand. The inductive approach means that the researcher will not begin with a hypothesis but rather gather the data and from the observations and patterns which become apparent, the researcher will then build a theory or framework, (Corbin and Strauss, 1990)

There are some disadvantages associated with grounded theory which should be mentioned. The main weakness is that it does not easily separate researcher bias from the results as it is highly qualitative, (Corbin and Strauss, 1990). Also, it tends to result in vast amounts of data which is often difficult and arduous to manage. Furthermore, its flexibility also means there are not any rules in terms of categorisation of data, therefore a certain level of skill is required for data analysis, (Charmaz, et al., 2003).

1.9 Thesis structure

There are eight chapters in this study. Chapter 1 consists of an outline of the research, made up of the motivations, the probable outcomes and consequences, the reasons for this study, its aims and objectives and the research questions that need to be answered. Chapter 2 contains the literature review and explains the three main sections of the study and analysis: the

implementation of Lean; organisational culture; and the setting of Saudi Arabia. In addition, address objective and question 1 by identify the organisational culture enablers and inhibitors to lean implementation in small and medium-sized manufacturing firms and literature gap. Chapter 3 analyses the research philosophy and why the research methods used were chosen. It also explains these methods and how they answer the research questions. Chapter 4 adress objective 2 to investigate, via a field study, the organisational culture enablers and inhibitors for lean implementation in Saudi Arabian SMEs in the manufacturing sector by explains how the researcher identified elements of Lean culture that stimulate the implementation of Lean and how this was done through participatory with the manufacturing SME participants in the study. A composite instrument was also devised to gauges and measure the occurrence and strength of the aspects of lean culture influences lean implementation. Finally, in this chapter, there is a presentation of the outcomes of the assessment which address question 2 what are the perceptions of SME employees and their extant position of the company's culture for encouraging Lean Implementation in KSA.

Chapter 5 address objective 3 which combined literature and empirical data to develop a framework to improve lean implementation within SMEs manufacturing sector in Saudi Arabia by focus on organisational culture aspects by explains how a framework was developed and to also provide an intervention that will stimulate a Lean culture that will encourage Lean implementation among SMEs. In addition, the framework developed is assessed and endorsed by experts which addressed the objective 4. Chapter 6 will discuss the findings. In addition, the developing of framework to improve lean implementation Chapter 7 will include a summary of the overall study, including the results obtained, how they were obtained and how they answered the research questions, academic, practitioner contributions and will advise of any areas of interest that arose during the study that warrant further research. A summary of the layout of the study can be seen in Figure 1-1.

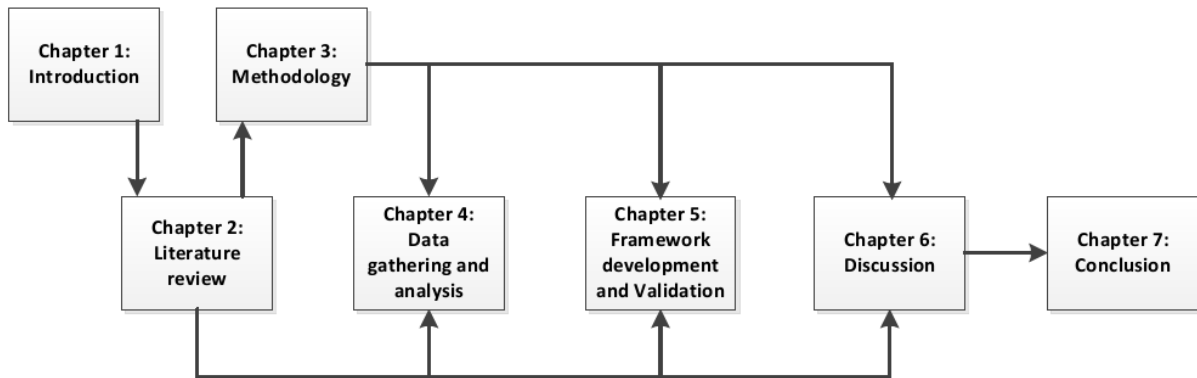


Figure 1-1 Thesis structure

2 Chapter 2: Literature review

There have been many literature reviews carried out on Lean implementation (LI) in larger organisations with specific focus on the automobile industry. Lean implementation among SMEs has not been so extensively researched. There are three sections in this chapter. The first will attempt to bridge the gap mentioned above by carrying out a literature review for Lean implementation in SMEs and will identify the main challenges faced. Tranfield et al (2003) proposed the systematic review methodology and that is what was used for this study. The reasons are as follows. Initially, three stages were recommended for a systematic review: the planning stage; the conducting stage; and the reporting or distribution stage. For this study, 389 papers were utilised, with their titles, abstracts and keywords separately studied. These were collated from certain databases, including ABI/INFORM Global, Taylor & Francis, Emerald, Sage, Inderscience, EBSCO Business Source Premier, ScienceDirect and Scopus. The information contained in them was sorted into four categories through classifying the literature. There are several reasons for this research and specific benefits that will hopefully occur because of it. Firstly, it has been noticed that there is no inclusive literature review on LI for Critical successful factors (CSFs) in the manufacturing sector prior to this. The aim of this study is to begin with a literature review and then examine the main categories of Lean implementation in the context of SMEs. Next, it is hoped that CSFs for Lean implementation will be established as a result of this review that will provide a comprehensive guide for SME owners and managers. Finally, it is hoped, that this review will provide academics with suggestions for further research. The second section in this chapter will consist of a literature review debating the effect of organisational culture on Lean implementation and Lean Culture. The third and final section will focus on Saudi Arabia as the setting for this research.

Keywords: Lean manufacturing; Lean implementation (LI); Literature review; Organizational culture (OC); Scopus); Critical successful factors (CSFs)

2.1 Section 1: Lean philosophy

2.1.1 Introduction

These days, markets are characterised by strong competitive forces, honed over the years (D'Aveni, 1994). The competitive nature of organisations has been encouraged by macro-forces influencing both supply and demand. Supply has been influenced by the rise in globalisation and the deregulation of trade, which has allowed companies to trade with greater ease on a global scale (Harvey *et al.*, 2001). In addition, advancements and accessibility to technology have facilitated better supply abilities among companies (Harvey *et al.*, 2001). Demand has been shaped by the increase in options available to customers, who now take time to determine the best value or product available when deciding to purchase an item (Bhamu and Singh Sangwan, 2014b). Companies now need to realise that they must increase their competitive capabilities in order to trade profitably in the markets today. This consists of a recognition of what the customer considers of value combined with the most effective methods of operation and production in order to provide customers with what they want so as to generate profits for the company (Bowersox, *et al.*, 2000). The "Lean" business ideology (Bhasin, 2013a) is a business method that promotes efficiency and elimination of waste, while also focusing on a high level of awareness of what the customer wants (Bhamu and Singh Sangwan, 2014; Shah and Ward, 2007). Due to this ideology the method has been adopted by many companies so as to direct their outlooks and exertions to best improve their operations. This shows how Lean is not limited to one type or size of company, but rather all types, sizes and industries that strive to increase their competitive advantages, operations and profits in the regional and global markets. This review explains how Lean manufacturing tactics should be altered to suit each individual company, a belief encouraged by Cooney (2002) who states the value of the universal business environments, the character of the buyer/supplier relationship and the construct of social and political establishments. The researcher will additionally discuss the significance of the business cycles that influence the individual functions in companies.

Zhou would be considered the main researcher into SMEs adopting Lean methods. To date, the research has mainly focused on larger companies implementing it (Dombrowski et al. (2010), in particular in the automobile industry. However, it should be acknowledged that SMEs can also take advantage of the Lean methodologies as long as they can successfully adapt them to suit their individual situations. Any company, regardless of size, faces challenges and the Lean methods have proven themselves beneficial, especially in the manufacturing industry, over the years. This has been supported by the number of companies adopting the methods and the large number of studies carried out that have supported its success in their results (Hu, Mason, Sharon J. Williams, *et al.*, 2015).

Companies come under one of two sizes: Small-Medium enterprises (SMEs); and Large Enterprises (LEs). It is noticeable that the level of integration of Lean manufacturing in SMEs is quite low (Shah, 2003) and that even knowledge of it is poor also (Achanga *et al.*, 2006). Many reasons for this have been identified, some of which will be discussed later on in this review. Although there have been many studies based on the general implementation of Lean (Hines, *et al.*, 2004; Holweg, 2007; Moyano Fuentes and Sacristán-Díaz, 2012) the majority of the research has concentrated on large enterprises and has omitted SMEs (Brown and Inman, 1993; Gnanaraj *et al.*, 2010). This discrepancy is significant and deserves rectification. Therefore, this study will complete a review on the literature relevant to the implementation of Lean in SMEs and will attempt to identify the main issues and obstacles to this. The following are the main questions that this review will aim to answer:

- Q1 What are the main characteristics and categories that have been identified in research studies based on Lean in SMEs?
- Q2 What are the Lean inhibitors and enablers of Lean implementation in SMEs manufacturing firms?
- Q3 What are the effects of this research for practitioners?
- Q4 What are the most usual barriers and challenge to manufacturing SMEs for implementing lean?

Q5 What areas could be further researched on this topic that would benefit SMEs when implementing Lean?

There are three main areas of benefit and contributions from this study. Prior to this research, there were no all-inclusive literature reviews completed on the implementation of Lean methods in SMEs in the manufacturing sector, therefore, this study aims to bridge this gap by completing such a study and by analysing the main categories and issues related to Lean implementation in SMEs. Secondly, it is hoped that this research will provide information, guidelines and suggestions regarding Lean implementation for SME owners and managers. Thirdly, this paper will suggest areas which supports further research for academia in the future.

The literature review will be divided into 10 sections and will start with the introduction. Section 2, a discussion on literature, will be in 2 parts: the first will introduce and explain the Lean concept, its conception and key attributes and impact; the second part will focus on the application of SMEs versus LEs. Section 3 will describe and justify the use of the research method used in this research, the systematic review methodology devised by Tranfield *et al.*, 2003. Section 4 and 5 will describe the analysis of the literature and the results deduced from these. These results will then be discussed in Section 6 and the consequences of these for researchers and practitioner are illustrated in Section 7 and 8 respectively. Section 9 is discussing of how the organisational culture and HR impact the implementation of Lean methods within a company. Section 10 will summarise this research regarding the 5 research questions.

2.1.2 An overview of Lean

Lean implementation refers to a company's management philosophy and a long-term strategy (Liker, 1997). In addition, the successful implementation of Lean is that the implementation of lean practices will reduce different type of wastes (AL-Najem *et al.*, 2013; Al-najem, 2014). In summary, it can be described as 'doing more with less' and, although this may seem a simplification, it sums up the Lean concept as a more efficient use of the resources available, when needed. Waste, both time and materials, is identified

and removed so as to maintain quality while reducing manufacturing costs (Shah and Ward, 2007). The successful implementation of Lean does not solely rely on the application of specific tools. There have been studies carried out that have identified several factors that can prove to be barriers to success. Bhasin (2013) has identified several such barriers arising in both SMEs companies, as well as LCs large companies, while Hancock and Zayko (1998) have also recognised issues faced by manufacturing companies while implementing Lean. On the other hand, successful implementation has several factors associated with it. Abernathy et al. (2000) identified that Japanese automobile companies, for example, Toyota, have a high implementation success rate due to their tenacity in thorough planned management of employees, resources and equipment,” an observation agreed by Liker (2004). The researcher explains that long-term planning and diligence is of more importance than short-term gratification and that successful companies recognise this and plan accordingly. Dombrowski et al. (2010) have identified several areas of activities that Lean consists of, including: continuous improvement; workplace organisation; 5S; process standardisation; visual management; total quality management (TQM); total productive maintenance (TPM); just-in-time (JIT); and production levelling (heijunka).

The term “Lean” was first used by Krafcik (1988) in his thesis for the Massachusetts Institute of Technology and was used to describe the Toyota Production System (TPS) (Shah and Ward, 2007). It was then referenced in two books, *The Machine that Changed the World* (Womack et al., 1990) and *Lean Thinking* (Womack and Jones, 1996), which lead to its mainstream introduction. Lean became a concept designed to describe the multiple activities carried out by Japanese companies that explained their heightened competitiveness advantages at that time. This was known as the “Japanese Way of Working”. Elements of the “Lean Idea” include: operations methods (such as zero inventories (Hall, 1983); just-in-time (JIT) (Karlsson and Åhlström, 1997) and lots of small volumes (Burcher, et al., 1996); the reinforcing of quality processes demonstrated by complete productive maintenance (TPM); and total quality management (TQM). Also included were empowered workers and employee

contributions which questioned the bureaucratic top-down management structures and four function-orientated structures of organisation that had conventionally characterised many “western” companies (Hines *et al.*, 2011).

This interpretation of Lean was validated by Shah and Ward (2003) who organised the Lean factors into four ‘bundles’: just-in-time bundle; total quality management bundle (TQM); total productive maintenance (TPM) bundle; and human resources management (HRM) bundle. To successfully implement these Lean factors in a company required a co-ordinated approach, steadfast management and a transparent alignment with the company’s structural plan.

Taking these factors into account, Lean would appear to be the opposite of the mass production method of manufacture, which is characterised by the competitive advantage of economies of scale. This is a bulk cost advantage considered to be advantageous, but in reality, creates substantial ineffectiveness between the functions. The Lean method opposes this as it makes companies and their supply chains concentrate on reducing waste – materials and time, and any activity that didn’t add value to the customers (Bessant and Caffyn, 1997; Hu, Mason, Sharon J Williams, *et al.*, 2015a).

Some of the benefits of the Lean method include increasing a company’s efficiency and effectiveness at an operations level. In addition to the apparent benefits there are less obvious benefits of Lean implementation:

(1) *Supply chain members incorporation* –the members of a supply chain become co-dependent and so have a common goal to achieve Lean implementation. This is translated across the entire supply chain, typified by the Japanese Keiretsu supply networks (Lamming, 1996). These networks are based on a foundation of trust and common goals and can increase capabilities across the whole supply chain network. This explains how the development of inter-organisation links built to facilitate Lean implementation among companies leads to greater collaboration and strategic so-operation between the supply chain members.

(2) *Lean facilitates a high-speed of learning* – Spear (2009) explored that this advantage can be sustain. He clarified that by:

- The problems Identified and corrected in fast way;
- Solving the problems in better way to structure new knowledge; and
- Sharing this knowledge more efficient at across the firm.

As part of the Lean process, these cooperative and collaborative behaviours are developed, and these are then developed at an increasingly rapid rate, more so than companies who have not introduced the Lean method. There are obviously many direct and in direct advantages to Lean but, in general, there is no single comprehensive definition for it. There have been many studies completed on the Lean method and many results reached. However, this has only led to several interpretations of what it actually is and what precise “characteristics should be identified with the Lean concept” (Bhamu and Singh Sangwan, 2014b).

Pettersen (2009) tried to summarise the Lean method by categorising it into four main approaches. Pettersen used the works of Hines *et al.* (2004) and Shah and Ward (2007) as his base and built on their proposals:

- “Leanness”, an operational philosophy;
- “Lean thinking”, a strategic philosophy;
- “Tool box Lean”, an operational practice; and
- “Becoming Lean”, a strategic practice.

This highlights the various types of Lean and warns researchers to consider the different categories as Lean refers to different things to different people. In general, however, there are some common features shared by all categories of Lean (Shah and Ward, 2007):

- To constantly look for and concentrate on those values important to customers;
- To align the function of the main and supporting processes with the delivery of these customer values;

- To make sure that the organisation as a whole is concentrating on supporting these processes so as to eliminate waste;
- To ceaselessly improve the fundamentals, for example, improving quality, capabilities, empowering individuals and teams and encouraging affiliations between other companies;
- To promote and encourage a system-wide belief in constant improvements.

2.1.3 Overview of SMEs

SMEs are enormous role and function in sector of manufacturing for around the world in term of production employment generation. In addition, Emerging technologies and globalization have a massive impact on SMEs. SMEs firms are trying roughly to apply a new methodologies /approaches /principle like Lean to fulfill continues performance. Unluckily, for the concept of adopting Lean Manufacturing has not been applied by a large number of Small and Medium Enterprises (SMEs) regarding to the time, cost and posterior advantages. Authors explored Critical Successful Factors CSFs of Lean implementation within SMEs include: organization culture, finance position, expertise and skill, performance of evaluation system, and leadership style and management (Achanga et al., 2006; Pingyu and Yu, 2010). Panizzolo et al. (2012) proposed that Lean manufacturing permeation in Indian SMEs and explored that organizational culture, vision and the strategy drives substantial improvement in the organization performance, most of the failure for implementing Lean in SMEs are: using wrong tool, using one tool to solve the problems, misunderstanding the situation, badly decision-making process, poor of external support such as customers, government, suppliers, organizational culture (wrong strategy and vision) and wrong consultants will collapse the implementation of Lean in SMEs to be successful (Rose et al., 2010). In contrast, LEs are more successful to implement Lean Manufacturing usage than SMEs (Lowe et al., 1997; White et al., 1999; Shah and Ward, 2003).

Although Lean has been accepted as a method capable of vast improvements within company operations, several researchers have stated that, for the most

part, only larger companies have implemented Lean and done so successfully (Shah and Ward, 2003; Bhamu and Singh Sangwan, 2014). This has raised the issue of whether SMEs would be able to benefit from the use of Lean methods, a matter of importance as the Lean method is generally accepted to be vital for the development of the World's economies. In the literature, it is worth noting how SMEs are defined. Importantly, that is no one definitive definition worldwide (Karlsson and Ahlstrom, 1997), although the European Commission (EC) have agreed on a description. This is not the same as in China or the US as, for example, in the former, SMEs should only have less than 999 employees, while in the latter, this number is 499, all the numbers illustrate of full-time equivalent. Table 2-1 illustrates the differences in SMEs worldwide.

Although it is important to keep in mind the differences between the various definitions for SMEs, of greater importance in this study is whether there is a difference in how LEs versus SMEs apply Lean methods (Rose, *et al.*, 2013). The issue here is whether a company's size is a determining factor in whether Lean methods can be applied in a company. This research will try to answer this question by examining the literature based on SMEs and Lean and the issues related to this.

The initial explanation for Lean would indicate that any Lean-based improvements are beneficial and even initiating Lean methods at the simplest stage of production will change and improve the overall values and beliefs of the company and its supply chain partners. This initial definition of Lean is obviously simpler and quicker to employ, which indicates that the scope of Lean needs to be determined for this literature review into Lean and SMEs. In addition, the financial outlay needed to introduce a full version of Lean could be out of the financial range of SMEs. Other aspects that need to be considered alongside the size and available resources of the company include the level of control the SME has over its supply chain and the influence it has over the demand for its products (some of the research has identified that this can heavily determine success rates, e.g. levelling off demand variability) (Dowlatshahi and Taham, 2009; Rymaszewska, 2014). Additional factors that

influence the success rate for implementation are an experienced and capable management with a focused vision and commitment to the Lean method, an invested workforce with a strong commitment to training, a salary and remuneration system that promotes success for the Lean method, a strong performance measurement system, an encouraging organisational culture and a commitment to quality. These can all be used to determine the extent that SMEs will be successful, or not, when implementing Lean.

Several studies have been carried out on the Lean method literature, including the evolution of Lean by Hines *et, al.*(2004), the ancestry of Lean production by Holweg (2007), a guideline synopsis of Lean by Moyano-Fuentes and Sacristan-Diaz (2012), and finally a literature review on Lean manufacturing by Bhamu and Sangwan, (2014). None of these studies, however, have specifically examined the implementation of Lean in SMEs as they all focused on large companies or Lean in general. The aim of this research, therefore, is to bridge this omission in the literature and complete a review on Lean implementation in SMEs and to supply information to SME owners and managers who wish to apply Lean methods and, finally, to propose further topics for research for academics and researchers. Table 2-1 illustrates the differences in SMEs worldwide.

Table 2-1 SMEs definitions in different countries source: (by author)

Area	Definition of SMEs
Australia	To 200 employees
Canada	To 199 employees
China	To 999 employees
EU & UK	To 250 employees
USA	To 499 employees

Source: (European Commission (2011), no date; Cunningham, 2011; Ministry of Industry and Innovation Technology of PRC (MIIT), 2011)

SMEs are the most common size of company in Europe and make up 99% of all companies in the EU according to the EU Commission (2011) and provide 90 million workers with jobs. Guidelines issued by the EU Commission outline the regulations for a company to be described as small or medium, which include turnover or employee numbers. These two figures don't have to be considered concurrently for a company to be deemed small or medium.

Wymenga, et al., (2011) have stated that SME companies in Europe are well behind those in Japan and the USA, particularly in relation to the competitive capabilities. European SMEs lack innovation and financial backing from their governments and, in addition, do not see the benefit of introducing new management methods or even researching them like, for example, the Middle East where there is very little research carried out on Lean implementation (Karim *et al.*, 2011). On the other hand, a company's size may provide benefits, for example, in their ability to be flexible to change with their manufacturing processes (Floyd and McManus,(2005). Also, smaller companies can respond quicker to the changing needs of their customers because they can observe the need to increase variety quicker. Additionally, Deros (2014) has explained how small and medium enterprises are better able to present personalised services, which they can use as a competitive advantage. Most importantly is that because SMEs are usually young companies they are staffed by younger employees with a more fluid organisational structure who may be more inclined to try innovative ideas and take risks. These authors also point out how SMEs are responsible for minimising the efficiency disparity between the EU and the USA. These ideas have been validated by Seitz (2003) who stated that SMEs are, by their disposition, better able to become Lean. He explains this statement by listing the company advantage that could enhance the implementation of Lean methods. These include: centralisation of power; empowering the workforce; simplifying the difficulty of interactions; organised communication; a fast decision-making process; transparent plan for the future; and the willingness to deliberate every idea and every employee's opinion. These were chosen because they are the characteristics of SMEs that potentially could

cause barriers for the implementation of Lean. This research will aim to investigate this through the literature review.

2.1.4 A methodology for conducting a literature review

The aim of this research was to complete a literature review on lean implementation in SMEs, based on the research questions. It was decided to use the systematic review methodology (Tranfield *et al.*, 2003) for several reasons. First, the systematic review can achieve a clear, scientific and reproducible process of analysis from previous research, (Suárez-Barraza, Suarez-Barraza *et al* 2012; Tranfield *et al.*, 2003). Second, although there are other systematic review guidelines available (Adolphus, (2011), Easterby-Smith *et al.*, 2012, and Seuring and Gold, 2012), the version proposed by Tranfield *et al.* (2003) was deemed the most appropriate. This is because this method expanded the medical science systematic review method and applied it to management research, including greater descriptive details on exhibiting results and evaluating the literature (Rashman *et. al.*, 2009; Thorpe *et al.*, 2005). This method had been extensively used across the management research area, in both innovation and organisational learning (Tranfield *et al.*'s 2003) for example (e.g. Becheikh, *et al.* 2006; Crossan and Apaydin, 2009; Rashman *et al.*, 2009) operations management and the supply chain (Chicksand *et al.*, 2012; Grubic and Fan, 2010; Suarez-Barraza *et al.*, 2012) and in the management of small companies (e.g. Garengo, *et al.*, 2005; Johnson and Schaltegger, 2015; Macpherson and Holt, 2007). The systematic review devised by Tranfield *et al.* (2003) suggested three stages for review: the planning stage; the conducting stage; and the reporting/dissemination stage.

1. Stage 1: Planning stage

A review panel was established during the planning stage made up of four researchers, all experienced in academia and industry. This was done to comply with Tranfield *et al.*'s (2003) recommendations that a group be created consisting of experts from the relevant area. Following four meetings, the direction of the systematic literature review was agreed, the research questions

were formulated and the criteria to be included and excluded were defined (see Table 2-2).

English-language papers were included, from both academic and trade journals as the researchers agreed that scholars frequently publish their findings on Lean in trade journals. However, newspapers, magazines and reports were not included as it was felt that these pieces provided only a glimpse into lean implementation instead of the comprehensive specific information or debate required for this research. Working papers were also omitted as it was felt that these contained personal opinions, and that these could be changed. During the meetings, the researchers also agreed on the bibliographic databases to be used, and included ABI/INFORM Global, Taylor & Francis, Emerald, Sage, Inderscience, EBSCO Business Source Premier, ScienceDirect and Scopus and the core databases in the area of business and management. In addition, keywords were established for searching the literature. As the topic of this study is LI within SMEs, 'Lean' and 'SMEs' were the main phrases used in the literature search. Also, because 'Lean' was established subsequent to 1988, phrases such as TPS and JIT (Samuel, 2011) were also included as keywords in the research as they are core components of Lean. SME is short-hand for small medium enterprise so small organisation, small business and small company were used in the search also. The panel's expertise was beneficial for providing suggestions for cross-checking the viability and strength of the method used, for example by identifying omissions or exclusions among the search phrases, periods of time or suitable databases. This provided validation for the systematic review process. Table 2-2 below illustrates paper selection criteria.

Table 2-2 Paper selection criteria source: (by author)

Criteria	Reasons
Inclusive criteria	
Papers written in English	Most leading academic journals are published in English
Papers published in both academic and trade journals	Lean-related articles written by scholars are published in trade journals
Papers study Lean implementation issues	This review is designed for Lean implementation
Papers focus on SME	SME is the focus of this review
Exclusive criteria	
Newspapers, magazines and reports	These types of articles and paper were more likely to provide a snapshot of Lean implementation
Working papers	These often represent researchers' temporary thinking and are subject to change
Papers do not focus on Lean and SME They	They do not fit the thematic areas of this review
General commentaries or grey literature They	They do not provide sufficient insights into the research area

2. Stage 2: Conducting stage

At the conducting stage, 'search strings' were composed from the search phrases agreed in the planning stage (see Table 2-3). Every search sentence was then input in an identical manner into the bibliographic databases and organised by abstract, title and keywords. The result was 398 papers, with a cut-off date of the 2nd of April 2017.

These 389 papers were then reviewed by each researcher to ensure that their title, abstract and keywords matched the focus of the research. This resulted in 189 papers being excluded as inconsequential. Among these were non-academic literature, for example, 'grey literature' and other writings that did not

include information into Lean implementation matters in SMEs. This led to an additional 81 papers being excluded as they were listed in two or more databases. This left 119 papers, containing either empirical research or conceptual research, that were again reviewed independently by the same four researchers for relevance. These papers were then entered an Excel spreadsheet and their information noted. This included the title, the publication year, authors, journals and further aspects of the articles that included the research topic, Lean implementation method, methods used in the research, areas of geographic research and the authors' profiles. Any papers that seemed ambiguous were classed as 'unsure' and were reviewed by the other three panel members for revision. The researchers and the panel had a discussion on the reasoning behind the panel's decisions and suggestions and a consensus decision was agreed for each item. This level of scrutiny and cross-checking of the documents for the literature review was to improve the validity of the study and the results. This sorting and subcategorising of the 119 papers distinguished four main categories among them (like the method used by Suarez-Barraza *et al.* (2012) in Lean literature review). The final organisation was reviewed, cross-referenced and agreed by the entire panel. Table 2-3 below illustrate keywords search.

Table 2-3 Keyword search source: (by author)

Search string combinations	Database
(Lean implementation) <i>AND</i> (small and medium enterprise)	ABI
(Toyota Production System (TPS)) <i>AND</i> (small and medium enterprise)	EBSCO
(Just in Time (JIT)) <i>AND</i> (small and medium enterprise)	ScienceDirect
(Lean) <i>AND</i> (small and medium business)	Emerald
(Toyota Production System (TPS)) <i>AND</i> (small and medium business)	SAGE
(Just in Time (JIT)) <i>AND</i> (small and medium business)	Scopus
(Lean) <i>AND</i> (small and medium organization)	Inderscience

Search string combinations	Database
(Toyota Production System (TPS)) AND (small and medium organization) (Just in Time (JIT)) AND (small and medium organization) (Just in Time (JIT)) AND (small and medium company) (Toyota Production System (TPS)) AND (small and medium company) (Just in Time (JIT)) AND (small and medium company) (Lean) AND (small and medium manufacturing (SME)) (Just in Time (JIT)) AND (small and medium manufacturing (SME)) (Lean implementation) AND (small and medium manufacturing) (Toyota Production System (TPS)) AND (small and medium manufacturing) (Toyota Production System (TPS)) AND (small and medium manufacturing)	Taylor & Francis

3. Stage 3: Reporting and dissemination stage

As per the Tranfield *et al.* (2003) method, it is recommended that this level of stage should include 2 sections: a descriptive analysis; and an analysis of the categories input onto an Excel spreadsheet, to present the “current state map” from the selected articles a descriptive analysis was undertaken. Secondly, four key categories that emerged from the literature review in categories analysis presented an in-depth look. In addition, a critical analysis of the review presents a discussion of how some factor strongly effecting the adopting of Lean Implementation. See Figure 2-1 for literature review methodology.

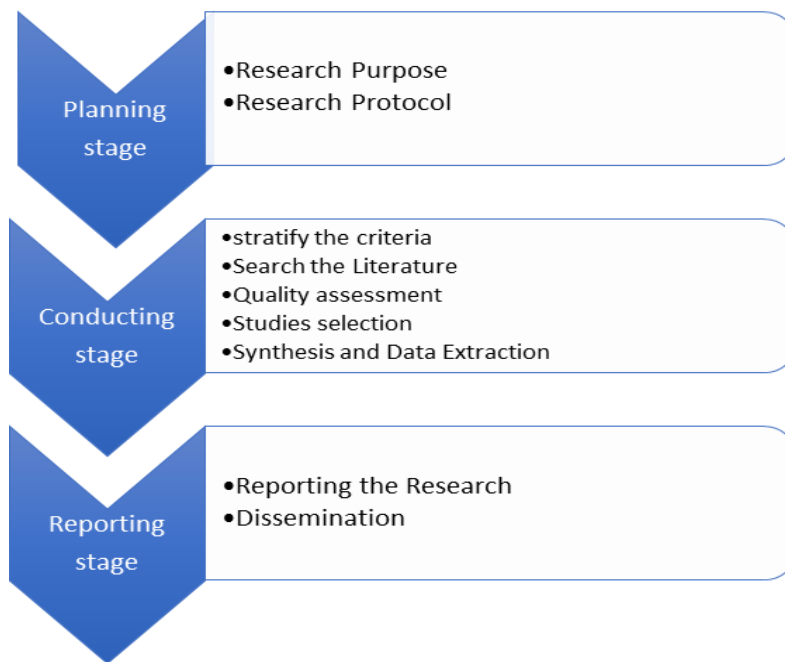


Figure 2-1 Methodology stage source: (by author)

2.1.5 Findings - Section one - Descriptive analysis

A descriptive analysis of Lean SMEs literature considered in this section. Tranfield *et al.* (2003) described that the descriptive analysis should consist of a “descriptive account of the field” by sorting the literature into categories. These categories are the research methods, distribution of author profile and geographic areas.

2.1.5.1 Research methods

The single case study was the main method of research used in the 119 papers, which made up 41% of the overall documents (see Figure 2-2) (e.g. GUPTA and BRENNAN, 1995; Lummus, *et al.*, 2006; Sohal, A.S. and Naylor, 1992; Yogesh, *et al.*, 2012). Surveys made up 35% of the documents (e.g., Burns, O.M. and Rishel, 1994; Dora *et al.*, 2013; Iris and Cebeci, 2014; Lee, 1997; Ravikumar *et al.*, 2016). At 19% were the conceptual papers that were based on the development of theoretical frameworks, models or guides for

SMEs to implement Lean (e.g. John and Heriot, 1993; Wanitwattanakosol and Sopadang, 2012). The shortage of research into Lean implementation in SMEs in multiple case studies, mixed methods research and action research now becomes apparent. Only 17 papers (14%) used multiple case studies (e.g. Achanga *et al.*, 2006; Stuart and Boyle, 2007). A further 8 papers (7%) used mixed methods, to include surveys, interviews or case studies (Bhasin, 2013; Lee, 1997; Pingyu and Yu, 2010; Timans *et al.*, 2011). As explained by Bhasin (2013) mixed methods is the best method to guarantee validity of the results, for example a questionnaire, as the various data sources can be cross-checked and cross-referenced. A recent study carried out by Emmitt *et al.* (2012) using an action research method detected and introduced variations in a small building company with the introduction of Lean. Emmitt *et al.*'s (2012) used Lewin's (1946) action research processes and proposed a comprehensive account of Lean implementation and included details of the collaboration between the researchers and the practitioner to apply Lean methods. Hence, this leads to the opportunities for researchers to apply other methodology such as grounded theory and ethnography (Binder and Edwards, 2010). Figure 2-2 illustrates the research method percentage of papers.

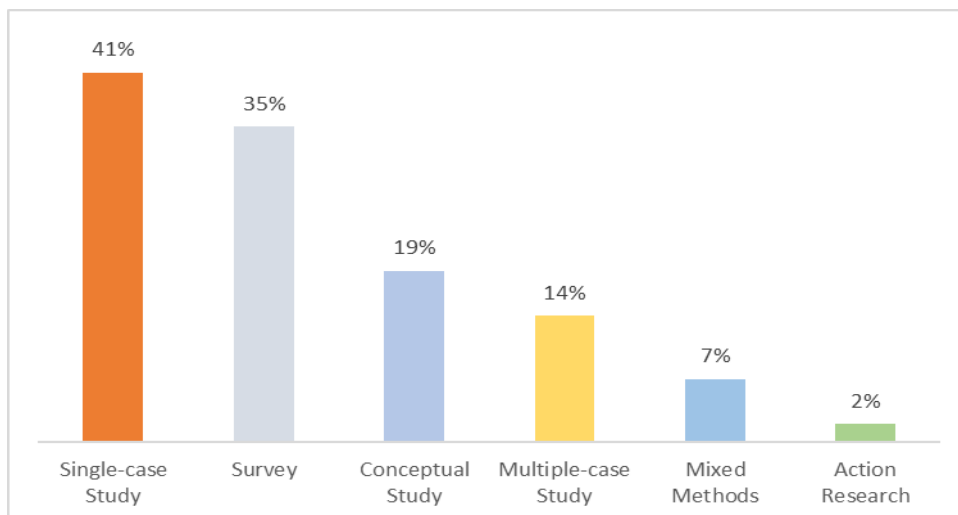


Figure 2-2 Research method percentage of papers source: (by author)

2.1.5.2 Division of the research field

Nearly all research in Lean implementation is carried out by academicians utilize manufacture information. In aggregate, 95 of researchers (82.78 percent) are essentially in the academic field (Achanga et al., 2006b; Dora et al., 2013; Dora, Kumar and Gellynck, 2016; Hilton and Sohal, 2012; Hines et al., 1998; Hines, Francis and Found, 2006; Kumar et al., 2006; Shah and Ward, 2007) also only 8 authors (4.78 percent) are practitioners (e.g.Doolen and Hacker, 2005; Howell, 2012; Salem et al., 2016; Sui Pheng and Joo Chuan, 2001; Sukwadi, Wee and Yang, 2013). In total, 16 of the researchers (12.44 percent) are both academics and practitioners. Figure 2-3 shows the distribution of author profile.

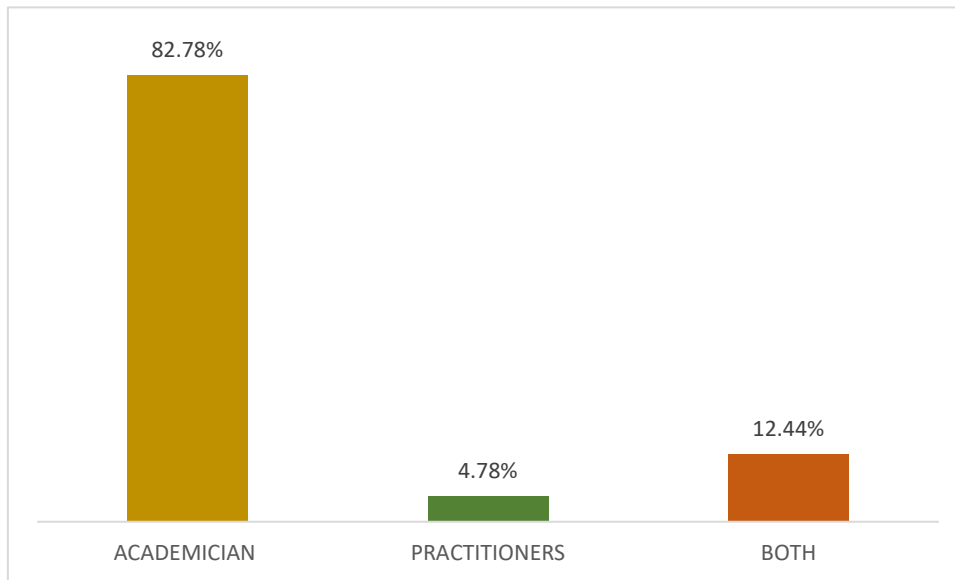


Figure 2-3 Distribution of author profile source: (by author)

2.1.5.3 Geographic areas

Out of the 119 papers 87 detailed the geographic area used. During the analysis stage, it became apparent that the majority of previous research has been based in western regions as 32% of the papers were EU based, 29% in the USA and Canada and 8% were from New Zealand and Australia (see Figure 2-4, 2-5). In Asia, which is arguably a major player in the global market, only 20 of the papers (28%) were based here (e.g. Gunasekaran and Lyu, 1997; Kumar et al., 2006; Lee, 1997; Li, Tan and Hida, 2011; Panizzolo et al.,

2012; Rahman, Laosirihongthong and Sohal, 2010; Rose, Deros and Rahman, 2014; Singh, Bhardwaj and Sachdeva, 2006; Sukwadi, Wee and Yang, 2013). Of these 20 Asian papers, it was found that the majority of them were based in India. Only 2 of the papers were concerned with the implementation of Lean in China and these examined Wenzhou's industrial industries (Pingyu and Yu, 2010) and the automobile industry in Taiwan (Gunasekaran and Lyu, 1997). There are currently 10 million SMEs in China, or 90% of all of China's companies, which make up 60% of China's overall GDP (Xinhua, 2011). This would indicate the importance of further research into Chinese SMEs and their progress with Lean implementation and a necessity for additional SME Lean research in the World's other developing countries such as South America, Africa and the Middle East. Figure 2-4 illustrate geographic area percentage of papers.

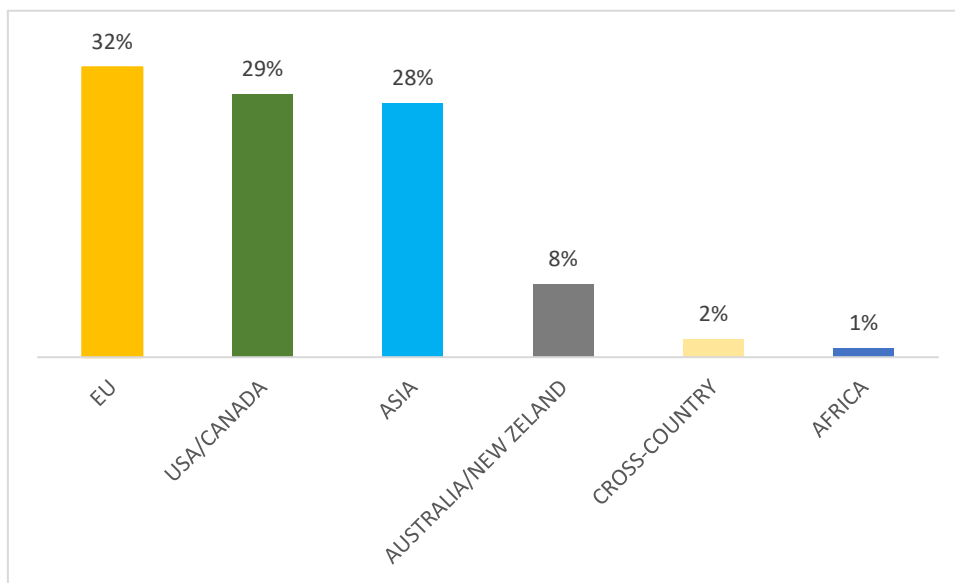


Figure 2-4 Geographic area percentage of papers source: (by author)

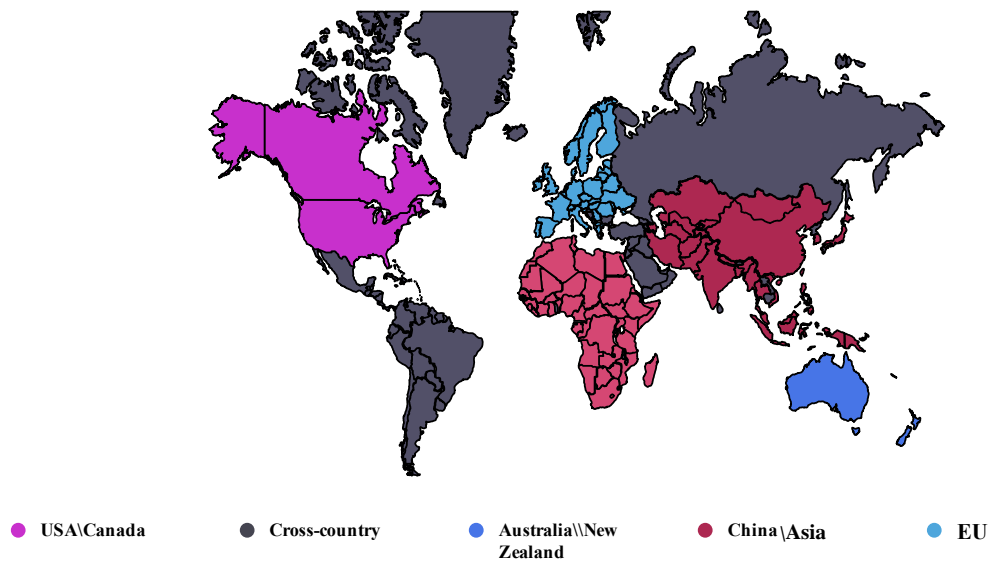


Figure 2-5 Geographic map source: (by author)

2.1.6 Findings - Section two – Categorization analysis

Tranfield *et al.* (2003) stated that investigation into the literature review categories would explain the extent of whether there is an agreement or not regarding the categories of applicable literature review areas and would highlight the developing categories and prospective questions for the research. There were four main categories recognised from the categorising and subcategorising exercise, completed in a manner similar to that used by Suarez-Barraza *et al.* (2012) in literature previous lean literature review:

- Category 1: examined the Lean range/type found in the literature as used by SMEs;
- Category 2: reviewed on the degree to which Lean is implemented in SMEs;
- Category 3: assessed the influence of Lean implementation on SMEs; and
- Category 4: assessed Lean implementation in SMEs' critical success factors (CSFs).

2.1.6.1 Category 1: The scope/type of Lean implemented in SMEs

The process or the model used for LI in small and medium enterprises was identified in the literature review by its apparent stress on internal operations (Table 2-4). The study by Wanitwattanakosol and Sopadang (2012) was the

only one included that made any reference to supply chains and lean implementation, incorporating suppliers. This agrees with the results of a study by Bhasin (2013) on Lean in UK manufacturing companies where he discovered that although 80% of the companies had implemented Lean internally, only 20% had applied it to their entire value chain.

Referring to Pettersen's (2009) typology of Lean, SMEs would seem to concentrate more on operations, the Lean method implementation seen as a variation of an operational custom or an operational belief. SMEs wouldn't often consider it strategic or beneficial to connect and integrate with their supply chain partners. This is in contrast to the Lean in LEs literature, where it is usually considered to be a strategic belief. Also, Stuart and Boyle (2007) stated that Lean application is not often observed outside of the factory of SMEs. However, Karlsson and Ahlstrom (1997) argue that Lean is applicable to SMEs supply chains, although there is not much to indicate if this is true. Table 2-4 represent lean implementation process.

Table 2-4 Lean implementation process source: (by author)

The scope of the implementation processes	Authors
External – supply chain	(Wanitwattanakosol and Sopadang, 2012)
Internal – production and operation processes	(Sohal, A.S. and Naylor, 1992; Chin and Rafuse, 1993; GUPTA and BRENNAN, 1995; Gunasekaran and Lyu, 1997; Kumar <i>et al.</i> , 2006; Thomas, Barton and Chuke-Okafor, 2008; Dombrowski, Crespo and Zahn, 2010; Gnanaraj, Devadasan and Shalij, 2010; Roth and Franchetti, 2010; Gnanaraj <i>et al.</i> , 2012; Bortolotti, Danese and Romano, 2013; Medbo and Carlsson, 2013; Van Landeghem, 2014)

2.1.6.2 Category 2: how Lean is implemented in SMEs

Most studies based on Lean in SMEs is focused on how SMEs go about LI. There are two subcategories to the categorisation analysis:

1- *Approaches to LI in SMEs*. The literature shows there are many approaches and Lean tools available to SMEs that would help to implement the Lean method (see Table 2-5). There are several articles that discuss and demonstrate this (Table 2-5). Some of these tools include mapping tools, Value Stream Mapping (VSM), Kanban and 5S/6S work place organisation schemes that can work in conjunction with visual management. TPM and standardised work are two other options.

There are several less popular tools mentioned in the SME Lean literature, including 5 Whys, Small Lot Sizing and Single Minute Exchange of Die, Level scheduling and Kaizen. Bhasin (2013) discussed the unpopularity of some tools among SMEs compared to the popularity of those same tools among LEs.

SMEs also seem to prefer a more varied choice of tools, rather than LEs, when implementing Lean. Mathur *et al.* (2012) advise SMEs to choose and use the simpler less expensive tools because of the limited time and budgets available to them. Despite this advice, there is very little in the literature that discusses the justification or motivation for the selection and permutations of the tools or methods used. This seems to be an obvious omission as the holistic approach is best recommended for the successful implementation of Lean (Hines *et al.*, 2010). Table 2-5 illustrate the key main tools used in SMEs

Table 2-5 The key main tools used in SMEs source: (by author)

Lean tools	Authors
Value stream mapping (VSM)	Kumar et al.(2006); Lummus et al. (2006); Chandandeep (2008), Chen et al. (2010); Roth and Franchetti (2010); Wanitwattanakosol and Sopadang (2012)and White and James (2014)
TPM	Gunasekaran and Lyu (1997); Lee, (1997); Gunasekaran and Cecille, (1998); Kumar <i>et al.</i> , (2006)
5S/6S and visual management	Gunasekaran and Lyu, (1997); Gunasekaran and Cecille, (1998); Kumar <i>et al.</i> , (2006); Rose, Deros and Rahman, (2013)
Fishbone diagram	Sohal, A.S. and Naylor, (1992) and Thomas, et al, (2008)

Kanban	Sohal, A.S. and Naylor, (1992); Lee, (1997); Abdul-Nour, Lambert and Drolet, (1998); Gunasekaran and Cecille, (1998); Roth and Franchetti, (2010)
Kaizen	Deb, et al (2010) and Rose, et al (2013)
5 whys	Chen, et. al, (2010) and Deb, et al (2010)
Level scheduling	Sohal, A.S. and Naylor, (1992)
Small lot sizing	Mathur, et, al.(2012)
SMED	Chin and Rafuse, (1993) and Mathur, et, al.(2012)
Standard work	Gunasekaran and Lyu, (1997); Chen, et. al, (2010) and Rose, et al (2013)

2- *How other supporting initiatives can be combined with the Lean approach in SMEs.* There is another aspect worth noting in the literature and that is the blending of Lean methods with additional supportive methods (Table 2-6). The most common method is the implementation of Lean and Six Sigma. Six Sigma is a method that focuses on quality control and assists improvements by collecting data and completing statistical analysis (Nabhani and Shokri, 2009), with the end goals to be the reduction of manufacturing and services costs and an increase in customer satisfaction (Thomas, *et al.* 2008). Lean and Six Sigma have an obvious connection and several SMEs are making use of this. Where this has occurred, it is observed that some researchers who have used Lean with Six Sigma have developed their own models, or Lean Sigma models, while others have generated less specific processes or methods for implementing Lean in SMEs. The focus in the Lean Sigma model is on assimilating certain Lean applications into the DMAIC methodology (define measure, analysis, improvements and control). A case of this is where Kumar *et al.* (2006), Roth and Franchetti (2010) and Thomas *et al.* (2008) detail the use of Lean tools, for example VSM and TPM, for every stage of DMAIC. Gnanaraj *et al.*, (2010) criticised this approach because they argued that the majority of SMEs were unable to implement Lean for various reasons and so, taking these into account, they suggested the DOLADMAICS model (Gnanaraj *et al.*, 2010a, p. 300). This version considers the features specific to SMEs that would hinder

them and devises solutions through 5 levels (Gnanaraj *et al.*, 2010b, 2012). This was a much more realistic model applicable to SMEs and included both Lean and Six Sigma factors. There was very little practical evidence that verified the entire implementation of this model.

Resource Planning (ERP) have to be incorporated in any Lean journey SMEs embark upon (Hu *et al.*, 2015b). Powell, *et al.* (2013a) devised a system for incremental IT implementation over a long period of time to take into account the Lean method of operating. Other combining approaches including Accounting Method, Cellular Manufacturing, Project Management, Quality Function Deployment (QFD), Theory of Constraints (TOC) and Quick Scan are evident, but attracted less attention (Hu *et al.*, 2015b).. Table 2-6 illustrate supporting approaches for implementation of Lean.

Table 2-6 Supporting approaches for implementation of Lean, source: (by author)

Other approaches	Authors
Six sigma	Kumar <i>et. al.</i> (2006); Kumar, <i>et. al.</i> (2009); Thomas <i>et. al.</i> (2009); Nabhani and Shokri (2009); Gnanaraj, <i>et. al.</i> (2010; Gnanaraj <i>et al.</i> , (2012), Roth and Franchetti (2010); Cheng and Chang (2012) and Timans <i>et al.</i> (2012)
IT (MRP, ERP, computer simulation, CAD/CAM and fuzzy system)	Santacecilia, (1992)Chin and Rafuse (1993), (Li <i>et. al.</i> (2011), Achanga <i>et. al.</i> (2012), Wanitwattanakosol and Sopadang (2012), (Esan <i>et. al.</i> , 2013), Powell, <i>et. al.</i> (2013b) and Iris and Cebeci (2014)
Accounting (ABC accounting and VSM accounting)	Chiarini, (2012)
Cellular manufacturing	Boughton and Arokiam (2000)
Project management	Abdul-Nour <i>et al.</i> (1998)
QFD	Ramaswamy <i>et al.</i> (2002)
TOC	Lee (1997)

2.1.6.3 Category 3: the impact of LI on SMEs

Generally, Lean implementation is examined at a micro level (the in-house manufacturing or processes of operation in SMEs) resulting in waste reduction arising as the main goal for the implementation of Lean in SMEs. Lean SMEs are mainly focused on efficiency incentives for example decreases in stock, storage, time, criteria cited in the literature to indicate this tendency to emphasise efficiency and effectiveness initiatives in Lean SMEs include reductions in inventory, space, time (Hu, *et al.*, 2015b) (i.e. substitution time, distribution time, lead time and throughput time) and the price of products, all of which, if successful, can provide huge benefits to SMEs (Boughton and Arokiam, 2000; Lummus, Vokurka and Rodeghiero, 2006; Grewal, 2008). efficiency and Quality (the use of the workforce) are two other areas where progress is important (Dora *et al.*, 2013; Li *et al.*, 2011; Roth and Franchetti, 2010; Dora *et al.*, 2013). Among the literature, only one study mentions Lean implementation in the supply chain (see Category 1), while several studies discuss the results of Lean on SMEs in terms of suppliers and customers (GOLHAR and STAMM, 1991; Sohal, A.S. and Naylor, 1992; Wadhwa, 2012). Again, only one paper detailed the financial benefits of Lean implementation in SMEs, which would seem an obvious area of importance (Zhou, 2012). This mentions that there could be a possible lag between execution and any monetary benefits, but Chiarini's (2012) analysis of accounting benefits from implementation show that the impact cannot be clearly observed from conventional methods of accounting.

A further tendency observed is where few researchers have examined how certain CSFs for the LI in SMEs can be altered or developed. Some of these CSFs include employee participation, support from senior management, dedication to the goal, teaching and learning, and changes to the organizational culture. Increased motivation among employees, interests and ability (GOLHAR

and STAMM, 1991; Sohal, A.S. and Naylor, 1992; Phillips, 1994; GUPTA and BRENNAN, 1995; Gunasekaran and Lyu, 1997; Panizzolo *et al.*, 2012) and the empowerment of employees (Seetharaman *et al.*, 2007) were examined, however Manoochehri (1988) alone illustrated changes in organisational culture through the implementation of JIT. This can all be observed in Table 2-7, which clearly shows the that Lean SME research has mainly concentrated on improvements in efficiency as opposed to effectiveness.

Table 2-7 Critical for estimate the impact of Lean on SMEs , source: (by author)

<p>Efficiency (e.g. waste reduction, cost reduction, quality and productivity improvement)</p>	<p>(Finch, 1986; Kaufman, 1987; Manoochehri, 1988; Erem and Massey, 1990; GOLHAR and STAMM, 1991; Sohal, A.S. and Naylor, 1992; Brown and Inman, 1993; Phillips and Ledgerwood, 1994; GUPTA and BRENNAN, 1995; Gunasekaran and Lyu, 1997; White, Pearson and Wilson, 1999; Boughton and Arokiam, 2000; Kinney and Wempe, 2002; Lummus, Vokurka and Rodeghiero, 2006; Singh, Bhardwaj and Sachdeva, 2006; Koh <i>et al.</i>, 2007; Seetharaman <i>et al.</i>, 2007; Grewal, 2008; Kalafsky, 2009; Mo, 2009; Rahman, Laosirihongthong and Sohal, 2010; Roth and Franchetti, 2010; Deb, Chakraborty and Bhattacharya, 2010; Li, Tan and Hida, 2011; Thun, Drüke and Hoenig, 2011; Bhasin, 2012; Mathur, Mittal and Dangayach, 2012; Mazanai, 2012; Panizzolo <i>et al.</i>, 2012; Wadhwa, 2012; Zhou, 2012a; Cheng and Chang, 2012; Emmitt, Pasquire and Mertia, 2012; Rose, Deros and Rahman, 2013; Seay, S. and Narsing, 2013; Dora <i>et al.</i>, 2013a, 2014; Bevilacqua <i>et al.</i>, 2014; Cunha <i>et al.</i>, 2014; Lande, Shrivastava and Seth, 2016)</p>
<p>Effectiveness</p>	
<p>Organisational Culture</p>	<p>(Manoochehri, 1988; Albliwi <i>et al.</i>, 2017; Wong, 2007; Stock, McFadden and Gowen, 2007; Lacksonen and Rathinam, 2010; Kamis N. Mohammed, 2012; Testani and Ramakrishnan, 2012; Bhasin, 2013b; Dora <i>et al.</i>, 2013; Bortolotti, Boscari and Danese, 2015; Knapp, 2015; Oudhuis and Olsson, 2015; Pakdil and Leonard, 2015; Achanga <i>et al.</i>, 2006a; Burdett, 2007; Woehl, 2011; Medbo and Carlsson, 2013).</p>
<p>Employee empowerment</p>	<p>(Seetharaman <i>et al.</i>, 2007).</p>
<p>Employee motivation, interests and ability</p>	<p>(GOLHAR and STAMM, 1991; Sohal, A.S. and Naylor, 1992; Phillips and Ledgerwood, 1994; GUPTA and BRENNAN, 1995; Gunasekaran and Lyu, 1997)</p>

2.1.6.4 Category 4: CSFs of LI in SMEs

A single article focuses on examining CSFs for LI in SMEs (Achanga *et al.*, 2006). The results of this study so far have identified that organisational culture, governance and management's strategies, funding availability, employee

professionalism and ability are the most important aspects for a SME to take into account when trying to implement Lean successfully. CSFs are, however, mentioned both directly and indirectly in several of the other papers (see Table 2-8). When these papers were examined, several trends became apparent. The first is that Achanga *et al.* (2006) considered employee involvement and participation to be additional and important factors. Panizzolo *et al.* (2012, p. 785) agreed that by including employees in quality improvement initiatives and increasing their levels of independence and accountability has been extremely beneficial in creating improvements in the performances of companies. Hines *et al.* (2010, p. 18) also verified this view, stating that it is vital to include all staff in the process of implementing Lean, regardless of the dimensions of the company. Other regularly observed CSFs include senior management assistance and dedication, teaching and learning and organizational change (which includes the beliefs, plans and vision of the company), all of which support Achanga *et al.*'s (2006) findings. Additionally, Panizzolo *et al.* (2012) corroborated this view by stating that willingness, senior assistance and dedication, competence and willingness to alter an organisation's culture and the improvement of skills among individuals and teams were some of the crucial factors to include for successful LI in SMEs. Although Bhamu and Singh Sangwan, (2014) agreed that these were all vital aspects they argued that they were crucial aspects for companies of any size and so not specific to SME concerns.

Ormsby *et al.* (1994) first stated that small companies should be urged to promote a supportive environment in its supply chain partners to successfully implement JIT. So and Sun (2010) showed how the continuous use of Lean in SMEs shows beneficial influences from supplier integration policies, for example, the sharing of information and including e-business. The importance of incorporating customers and working in unison with supply chain members was also highlighted by Timans *et al.* (2012). This would indicate that the inclusion of supply chain members should be an important addition to the CSF list (this was not mentioned in Achanga *et al.*'s (2006) study). Panizzolo *et al.* (2012, p. 786) explained the importance of top management and their level of

commitment towards a long term vision of added value for not just customers, but society in general, and to the improvement and support of employees and partners. Mazany (1995) stated that the main barrier to successful implementation isn't technical but human. In the papers, Achanga *et al.* (2006) pointed out the financial restrictions of SMEs but only a single study identified available finances as a CSF. This would indicate the lack of a definitive agreement towards the relevance of available finances in SMEs for implementing Lean successfully. It is also important to note that the research into CSFs goes beyond internal organisation to the supply chain in recognition of how necessary it is to incorporate suppliers and customers.

Two more important CSFs to consider are communication and personal experience. Lee (1997) claimed that only by maintaining direct communication between management and the workforce would JIT implementation be successful. Timans *et al.* (2012) discussed the relevance of personal experience, for example a prior role as a quality manager, as a CSF. Despite this, however, there is little actual evidence for these CSFs as Lee came to his conclusion following a conceptual analysis and Timans *et al.* (2012) devised his results following a single interview. It has been suggested, at this point, that successful Lean implementation requires a clear guiding framework and not a reliance on the Lean tools, although this is not summarised in the papers reviewed. There have, however, been several standard frameworks proposed to facilitate synchronised use of Lean tools and methods (see Gupta and Brennan, 1995).

A usual starting point for Lean implementation is to develop engagement and education between employees and managers to prepare them for Lean. Chin and Rafuse, (1993); Gunasekaran and Lyu (1997) and Van Landeghem (2014) agreed with this when they recommended starting with training and developing employees and managers instead of diving straight in with Lean tools. Chin and Rafuse (1993) also suggested continuing this education and learning throughout the Lean implementation. Dombrowski *et al.* (2010) completed an exercise where he equated and compared three methods of acquiring Lean-

based information, that could be taught at various stages of the process. There will be a summary of the results and conclusions reached in this research that will be illustrated later that can educate SMEs on how to implement Lean. Table 2-8 below represent a summary of critical successful factors (CSFs)

Table 2-8 Summary of CSF

source: (by author)

CSFs	Authors
Employee involvement and participation	Chin and Rafuse (1993), Gupta and Brennan (1995), Mazany (1995), Lee (1996), Ramaswamy et al. (2002), Kumar et al. (2009) and Panizzolo et al. (2012)
Effective Leadership	(Boyer, 1996; L Bamber and Dale, 2000; Lewchuk, Stewart and Yates, 2001; Motwani, 2003; T. Papadopoulou and Özbayrak, 2005; Achanga <i>et al.</i> , 2006; Worley and Doolen, 2006; Sim and Rogers, 2008a; Boyle and Scherrer-Rathje, 2009; Puvanasvaran <i>et al.</i> , 2009)
Top management support and commitment	Chin and Rafuse (1993), Lee et al. (1994), Lee (1997), Achanga et al. (2006), (Kumar et al.,(2009); Emmitt et al. (2012), Panizzolo et al. (2012), Rose et al. (2014) and Timans et al. (2011)
Training and education	Gupta and Brennan (1995), Lee (1997), Ramaswamy et al. (2002), Achanga et al. (2006), Kumar et al. (2009), Timans et al. (2012) and Dora et al. (2013)
Organisational culture (change, strategy, vision and performance evaluation system)	(Achanga <i>et al.</i> , 2006); Kumar et al. (2006), Panizzolo et al. (2012), Timans <i>et al.</i> , (2011); Bhamu and Singh Sangwan, (2014); Ravikumar <i>et al.</i> ,(2014); Rymaszewska,(2014); Dora, Kumar and Gellynck, (2015); Gupta, Sharma and Sunder M., (2016); Lande, Shrivastava and Seth, 2016; Albliwi <i>et al.</i> , (2017); (Manoochehri, 1988; Albliwi <i>et al.</i> , 2017; Wong, 2007; Stock, McFadden and Gowen, 2007; Lacksonen and Rathinam, 2010; Kamis N. Mohammed, 2012; Testani and Ramakrishnan, 2012; Bhasin, 2013b; Dora <i>et al.</i> , 2013; Bortolotti, Boscarri and Danese, 2015; Knapp, 2015; Oudhuis and Olsson, 2015; Pakdil and Leonard, 2015; Achanga <i>et al.</i> , 2006a; Burdett,

CSFs	Authors
	2007; Woehl, 2011; Medbo and Carlsson, 2013).
Financial capability	Achanga et al. (2006) and Ravikumar et al. (2013a, b)
Supply chain integration	Ormsby et al. (1994), Lee (1996), Kumar et al. (2009) and So and Sun (2010)
Direct or good communication	Lee (1996), Rose et al. (2014) and Timans et al. (2012)
Personal experience	Achanga et al. (2006) and Timans et al. (2012)
Technical factors (on-going improvement, JIT concepts on shop floor, etc.)	Chin and Rafuse (1993)

2.1.7 Is the size of the SME an enabler or inhibitor of Lean implementation?

SMEs are, obviously, smaller than LEs, but the relevance of that for this research is whether size influences a company's ability to successfully implement Lean? The literature would seem to suggest that it does, in both the company and the supply-chain, and also that several aspects of SMEs that are of actual advantage when applying Lean.

2.1.7.1 Inhibiting factors for SME siz

A consideration in relation to size is the issue of the control over the supply chain. This plays a part in the degree to which a SME can develop dependable supplier networks and how much they can include them into the Lean scheme. Dowlatshahi and Taham (2009) and Wilson and Roy (2009) explained how the usually smaller volumes produced by SMEs limited their negotiating powers in contrast to the larger suppliers. Finch (1986) further said that including customers and suppliers in JIT delivery and standardised workloads was unrealistic as SMEs hadn't the negotiating power with their suppliers. Manoochehri (1988) expanded on this and stated that in order to fully implemented JIT, the company, regardless of magnitude, needs to be able to:

- Alleviate demand;
- Produce merchandise or parts in smaller JIT runs; and
- Take receipt of component materials from suppliers in the necessary amounts at the correct time.

Manoochehri (1988) accepts that, due to the status of the majority of SMEs in the marketplace, they are unable to achieve the first and third of these. This would indicate that Lean in SMEs is more like JIT production (i.e. an improvement in the operations through waste reduction) rather than JIT delivery, where it can be included into the supply chain. Therefore, it is more common for SMEs to promote the JIT process and aim for influencing the Lean supply chain, instead of actual compulsory practice (see e.g. Panizzolo *et al.*, 2012).

A study carried out by Karlsson and Ahlstrom (1997) considered whether the Lean method and principles could be used by SMEs. The results stated that, for the most part, they could but the principles concerned with procurement and distribution would need to be adapted for SMEs. No other paper in the literature review examined SMEs ability to apply Lean to their supply chains. Other barriers that arose from the literature for Lean implementation were at an operational level and included poor processes and quality control systems (Lee, 1996 and 1997). Additionally, in SMEs, the majority of the workforce are taken up with day-to-day operations and so changes to these operations could be difficult. Organisational culture would seem to be the remedy for this as this would include more than just a plan for improving operations (Panizzolo *et al.*, 2012). The benefit of this is that it would also manage the organisational strategic issues needed for Lean implementation and the HR department, for example: developing the employees, encouraging authorisation and inclusion in making decisions and guaranteeing that there is an accommodating organisational culture for Lean (if none, develop it). Most of the research didn't take the importance of organisational culture into account, focusing instead on operations and not considering any of the cultural issues and factors that need to be managed simultaneously (Achanga *et al.*, 2006; Testani and Ramakrishnan, 2011; Dora *et al.*, 2013b; Kumar *et al.*, 2014)

Financially, the majority of the researchers explained that most SMEs lacked the budget (Golhar *et al.*, 1990; Ormsby *et al.*, 1994; Lee, 1996; Dowlatshahi and Taham, 2009; Thomas *et al.*, implementation 2009; Mazanai, 2012) and buildings or amenities (Bought on and Arokiam, 2000; Panizzolo *et al.*, 2012) necessary for the implementation of Lean. The continuous implementation of a full Lean method necessitates large financial outlays prior to any benefits being observed and most SMEs simply may not have this level of finances available to them, in addition to the time needed for education and the development of knowledge (see e.g. Mazanai, 2012). Take, for instance, infrastructure, which has been identified as a key performance indicator (KPI) system supportive of Lean but is also a barrier for SMEs as they might not have needed such a system previously, compared to LEs. Also, SMEs may not have the budget to

employ specialised Lean facilitators. From the point of view of the customer, some of the papers stated that varying demands was a problem for SMEs as, due to their size, they had limited control over their customers with which to direct trends. This made them predictable and secure (Bought on and Arokiam, 2000; Dowlatshahi and Taham, 2009; Rymaszewska, 2013).

2.1.7.2 Enabling factors for SME size

Karlsson and Ahlstrom (1997) noticed that SMEs usually focused on certain areas of business, which meant that their suppliers were reliant on them because there are no other alternative buyers available. This actually provided the SMEs with the ability to direct the supply chain, which provides a counterbalance to the barriers discussed above. SMEs have other beneficial factors for implementing a Lean strategy. Communication is a vital component of successful strategy, both up, and down, within the company hierarchy and among roles and sections (Karlsson and Åhlström, 1997). This actually suits the structure of SMEs because some of their main characteristics include a lot of groups working together and a positive culture of interconnection that aren't limited by functional limitations. Also, communication in small companies is more straight forward and staff and management work closer together, which enables greater opportunities for one-on-one interaction (Dowlatshahi and Taham, 2009). Production systems in SMEs are more adaptable due to their smaller size and are able to manufacture products in small runs to comply with multiple requirements of their customers (Lee, 1996). This actually gives them the advantage over LEs that are designed around economies of scale for their product manufacturing policies. SME leadership can also be of benefit as SMEs are usually owned privately. Therefore, the owner usually has a long-term focus with a strong commitment to progressing and maintaining their business. This is vital for a successful Lean implementation so it is extremely supportive if the owner/leader is committed to the Lean strategy (Ronstadt and Rudolph, 1990). Again, due to size, the owners/leaders of SMEs also have greater access to their customers and can better appreciate and foresee their needs and values. This gives them the ability to respond quicker, which is a vital component in any Lean project.

As mentioned previously, SMEs can often experience difficulties when trying to finance a serious project like Lean, however, Dowlatshahi and Taham (2009) highlighted that there is often support and grants available from governments or other agencies that specifically focus on SMEs. Unfortunately, dependence on external assistance, like a consultant, for implementing Lean can cause its own problems (Hu, Mason, Sharon J Williams, *et al.*, 2015a). Table 2-9 illustrates the barriers and benefits connected to the size of an organisation when considering SMEs trying to implement Lean. So, although there are some obvious advantages to a smaller size, SMEs are generally at a disadvantage when it comes to implementing Lean. Therefore, the barriers to this need to be eliminated or reduced or the benefits need to be used to their maximum advantage. Table 2-9 represent the enablers and inhibitors for SMEs.

Table 2-9 Enablers and inhibitors for SMEs

source: (by author)

Aspects	Enablers	Inhibitors
Supplier relationship	Suppliers may be highly dependent on a SME focusing a market niche (there are no other customers for the supplier to switch to, so SME has more power to influence the Lean agenda)(Karlsson and Åhlström, 1997)	SMEs may lack the market power to influence supplier network in adopting Lean practices (Golhar et al., 1990; Ormsby et al., 1994; Lee, 1996, 1997; Dowlatshahi and Taham, 2009; Wilson and Roy, 2009; Mazanai, 2012)
Intra-SME Organizational	Owner’s long-term commitment to survival and profitability can give Lean the backing and support it may need (Ronstadt and Rudolph, 1990)	Potential lack of vision, management commitment and support as the SME leader may be highly involved in day to day operations and other matters (Lee, 1996; Lee, 1997; Panizzolo et al., 2012; Rymaszewska, 2013, 2014; Wilson and Roy, 2009; Yogesh, ,et al., 2012)
	Multi-skilled, cross-functional employees better positioned to be able to support Lean process improvement across the organisation (Ronstadt and Rudolph, 1990; Lee, 1996)	Lack of support for training and knowledge development required for Lean initiatives (Golhar et al., 1990; Lee, 1997; Dowlatshahi and Taham, 2009; Mazanai, 2012; Panizzolo et al., 2012 Rymaszewska, 2014; Yang and Yu, 2010)
	Higher level of group teamwork and cohesiveness, a feature of the Lean way of working (Lee, 1996; Dowlatshahi and Taham, 2009) Ease of communication (Rymaszewska, 2014; Winston and Heiko, 1990)	Workforce fluctuation (SME employee turnover maybe higher so the knowledge of Lean may be more easily lost) (Rymaszewska, 2013; Williams, 1985)
Operational		Poorer process and quality control tools and systems (Lee, 1996,

Aspects	Enablers	Inhibitors
Financial	Government support more likely to be available (Dowlatshahi and Taham, 2009) – but dependence on outside agencies like consultants to implement Lean can be problematic (Hu et al., 2014)	1997) Lack of sufficient funding and capital (Golhar et al., 1990; Ormsby et al., 1994; Lee, 1996; Dowlatshahi and Taham, 2009; Mazanai, 2012; Rymaszewska, 2014; Thomas et al., 2009;) Lack of infrastructure and facilities (Boughton and Arokiam, 2000; Panizzolo et al., 2012)
Customer relationship	More direct contact with customers (Ronstadt and Rudolph, 1990)	Less able to influence demand volatility and variability (Boughton and Arokiam, 2000; Dowlatshahi and Taham, 2009; Rymaszewska, 2013)

2.1.8 Small and Medium Enterprise Lean practice

There are implications for practitioners in this thesis. It contains a comprehensive list of Lean CSFs and possible enablers and barriers for an effective and workable Lean implementation, which practitioners need to know when they begin their project. These CSFs and possible enablers and barriers were collated during this systematic review and provide a guide for the SME owners, managers and practitioners.

The very first thing a SME needs to consider when introducing Lean is the organisational culture. The owners or managers need to ensure that this is supportive and fully engaged in Lean implementation. Operational issues need to be reviewed during the planning process for Lean and these can include organisational level issues, for example, planning the investment strategy (when to buy new equipment or improving the processes surrounding the existing equipment), which are key for an SME strategic implementation plan. SMEs need sufficient resources to finance Lean and not need immediate performance awards to come through. Also, because of the various types of Lean, the owners/managers need to agree the version they plan on implementing before beginning. This version can be reviewed and amended during the process. In addition, SME owners or managers need to continuously pursue external sources of funding and support, for example, from government agencies or Lean specialists.

Lean success depends on recognising what is considered value by the customers. This, therefore, needs to be established from the outset and will guarantee that SMEs can direct the Lean process towards a concise comprehension of what the customer values. These values should be constantly reviewed as they sometimes change. SMEs usually have a flat organisational structure and work to informal working relationships. This enables direct and rapid communication between management and employees. This type of structure allows a more efficient dispersal of the Lean method throughout the SME and guarantees employee engagement. Employee training is another vital issue to consider for Lean implementation, but SMEs have long been

considered remiss in the development of knowledge, which is necessary for Lean. This is why SME owners or managers may find that the use of specialists may be beneficial. Prior to the commencement of the Lean implementation, SMEs need to be assured of their processes' quality, components and end products. Lean eliminates time and inventory waste but needs a 'right first time' operation. If quality is inconsistent this could mean a failure of Lean, which has disastrous consequences for the customer. A quality audit is recommended to determine if a company is ready to commence Lean or not. Due to the financial and human resource constraints experienced by SMEs, the most necessary Lean tools need to be applied initially (for example visual management, 5S/6S, VSM and Standard Work) in addition to organisational improvements such as performance evaluation systems and appraisal criteria, while the more complicated tools (TPM) and supportive initiatives (IT) that require greater financial outlay, time and training (performance investment) can be introduced later on in the Lean project. It is important to recognise that no improvement in organisational performance might be apparent until, at minimum, the basic tools have been utilised. This reflects the time lag that occurs between the implementation of Lean and any visual benefits. This was explained by Chiarini's (2012) review of the usual accounting process that prevents any immediate observable advantages of the implementation of Lean. The "performance improvement" stage requires constant financial input, but the performance benefits are apparent. Another characteristic of SMEs is their inability to influence their supply chain due to their size so, instead, it is recommended that they utilise Lean internally up to the point of their supplier. This paper concludes that implementing Lean is a long-term process and that SMEs need to take the long-view approach by improving their organisational process gradually.

2.1.9 Small and Medium Enterprise Lean research

One of the aims of this review was to identify areas of additional research on Lean implementation. These areas will be detailed as follows. Initially, three areas became apparent from the 'descriptive' literature review. The first is that

there was very little research carried out that used grounded theory and ethnography, action research or mixed method when researching Lean implementation in SMEs. These methods are particularly good for obtaining a more in-depth view of LI in SMEs. Second, most of Lean research up until now has focused on the Western countries and have largely ignored developing countries such as the Middle East and Asia. Suitable aspects of research based on this could include comparative case studies of SMEs LI in developed versus developing countries to determine the application of Lean tools in SMEs in developing economies. Third, Lean's current focus is in academia, mainly due to its origins in the academic sector, but, as it is now finding popularity in the manufacturing sector, research is needed in this context.

Six areas for further research became apparent from the 'categories' literature review. It was obvious that prior studies had mainly concentrated on methods used to implement Lean in SMEs. Further, focusing on soft issue is needed for example, influenced by organisational culture, rather than on technical and tools issue on why certain tools and techniques were chosen. Lean also needs to be scrutinised at a higher organisational and theoretical level, which would explore issues concerned with strategy and philosophy. Additionally, areas such as why Lean is adopted by SMEs, how it is assimilated into their existing strategies and how Lean influences business direction and their culture in SMEs are all worth investigating. Lean is a method with substantial ramifications to the way an entire company is operated. A study on the difference between SMEs and LEs based on this would also be worth investigating. As previously discussed, SMEs are limited in the extent of their influence over their supply chain, but this is seen as a crucial component for a fully implemented Lean method and so would seem to be an important area to research further. Again, as discussed previously, the size of SMEs causes certain issues in comparison to LEs, so an area for further study is: how much of an issue is this when implementing Lean?

Another area worth concentrating on is the financial issues faced by SMEs. Monetary capabilities and the effect on Lean in SMEs, in addition to financial

benefits from Lean should all be reviewed. Research should also be carried out on the operational benefits that go beyond developments in improvements.

Finally, because much has been made of the issue of organisational size when implementing Lean, this has been identified as a common and vital issue for SMEs. Further information is needed on the differences and similarities in Lean implementation between SMEs and LEs in regards their sizes. Further empirical studies, for example longitudinal studies, would be useful for additional studies for examining CSFs discovered in prior research and to assess their effectiveness for both SMEs and LEs. In addition, there is a need for a framework for SMEs manufacturing to facilitate LI by leveraging aspects of OC.

2.1.10 Organizational culture challenges in Lean manufacturing implementation

First, the link among organization culture as well as Lean manufacturing implementation is highly critical and sensitive. Different nations have different labor intensity, development, culture, customs relation, industrialization position, education and training, land cost, traffic situation and firms should take these challenge matters into their consideration when adopting and apply Lean manufacturing. Organizational cultural contribute for Lean cooperation is recommended to apply and the implementation basics of the Lean manufacturing (Pérez-porras *et al.*, 2014; Chen and Meng, 2010a). Organizational cultural variation relate fundamentally for the openness and change's resistance internally (Delgado *et al.*, 2010). The gaining of Lean manufacturing implementation relies broadly on the work firm's practices. For instance, Toyota have done in 1990s works with skill based on practices from a seniority based on strategy planner. Several crucial work firms' practices widespread to the manufactories that succeeded implemented the principle of Lean manufacturing are: discipline and control, standardization, team based organization, continuous training as well as learning, multi skilling, participation, empowerment, reward system, common values, commitment, methods of work, communication. (Emiliani and Stec, 2004; Olivella *et al.*, 2008). In the beginning of the research Lean implementation has indicated that the function of

rewarding system, the support of the management level, accounting management system. (Boyer, 1996; Karlsson and Åhlström, 1996, 1997; Worley and Doolen, 2006). Conti et, al. (2006) used the model of Karasek job stress to relate Lean shop floor application and practices to expected operator overwork and found that the overwork and lead to stress, also is notable at managerial scale in operating the system of Lean implementation and designing teams and not just only in the level of workshop scale. The globalization has cause more demands for organizations in terms of labor market and many SMEs organization are hiring contractual operators to support their productivity to stay sustainable and Lean. Organizations should train temporary labor to progress the effectiveness as well as the efficiency of the lean implementation continues improvement initiatives, also should control as well as manage develop (Tan *et al.*, 2013). Organisational culture that is supportive to Lean is of huge advantage to a company when implementing Lean (Liker, 2004; Hines, *et al.*, 2008). Involving the employees from all functional areas of the company is of great benefit as their input and feedback can determine whether Lean implementation is successful or not. Inclusion increases employee participation and having ideas listened to increases their job satisfaction levels. It also promotes positive team work, provides opportunities to demonstrate leadership qualities and problem solving. Storch and Lim (1999) explained how Lean requires effective application, which in turn necessitates open and effective communication between all concerned participants of the value operation. Prior to the introduction of Lean, all parties need to agree and satisfied with the goals and objectives. Change, in general, usually requires some form of training and development, and this is true for Lean implementation also, which requires multi-skilled, adaptable workers. Finally, organisational culture can be a powerful, positive enabler for Lean in SMEs (Alkhoraif and McLaughlin, 2016). Table 2-10 illustrates some of the factors associated with HR that can assist the implementation of Lean (Bhamu and Singh Sangwan, 2014b).

Table 2-10 OC important factor for successful LI, source: (by author)

Culture (organizational societal and societal)	Dealing with inhibition
Communication	Performance feedback
Hiring, contractor, recruiting, and training Communication	Focus on deployment and policy
Communication	Development of employee
Human resource systems	Leadership quality
Spread out knowledge into decision making.	Multi-functional sector and team
	Responsibilities and roles

2.1.11 Summary

There is a consensus that SMEs are a crucial component for a strong, successful economy. Lean is a well-established method of organisational philosophy that enables companies to improve operations and trade more effectively with greater value and less waste. Taking both into account, it is no wonder that the topic of Lean implementation in SMEs is such an important issue and a matter of concern that there is such poor take up of Lean among SMEs (Shah and Ward, 2003). The research has demonstrated the lack of information and knowledge concerned with the implementation of Lean in SMEs, in comparison with implementation among LEs. In addition, there was very little research carried out that used grounded theory and ethnography, action research or mixed method when researching Lean implementation in SMEs. also, most of Lean research up until now has focused on the Western countries and have largely ignored developing countries such as the Middle East and Asia. Moreover, Lean's current focus is in academia, mainly due to its origins in the academic sector, but, as it is now finding popularity in the manufacturing sector.

The aim of this research is to bridge this gap through completing an inclusive comprehensive evaluation of academic research writings referring to the LI in

SMEs. Tranfield *et al.*'s (2003) procedure for classifying the literature was the method deemed most appropriate as it does so through explanatory and category lines. The explanatory aspect identified that SME Lean research consists mainly of survey research methods and single case studies. Most of SME Lean research base has concentrated on Lean implementation in smaller manufacturing companies in the Western countries. Four main categories were identified through the comprehensive analysis of the literature: what type of Lean is applied by the SMEs; how its applied and implemented; the effect of Lean implementation on SMEs; and finally, what are the critical successful factors for the LI in SMEs? Analysing these main categories has resulted in 9 suggested areas for further research for academics. It is hoped that the gathering of the information contained in this research will provide a comprehensive, understanding of Lean in SMEs, in contrast to the current, fragmented views currently held (Bhamu and Singh Sangwan, 2014). The study has highlighted the importance of organisational culture for successful, sustainable LI.

Limitation of systematic review: This research has several limitations. The first is in relation to the precise terminology agreed for the literature search, which may have meant that certain papers were omitted. Additionally, there may have been limitations due to the systematic review methods related to the availability of the literature sources (Easterby-Smith *et al.*, 2012). The researchers used 6 main databases to compile the papers for the literary review, which meant that certain books or theses not online may have been unavailable for this review. Four researchers were used for the review panel, which led to an issue of disagreements between them and how to solve them. Tranfield *et al.* (2003) proposed that panel meetings should be used to solve any differences of opinions. For this research 'unsure papers' were cross-referenced among the researchers and the review panel and criteria was established for sorting these 'unsure papers' before any final conclusions were made. An issue in the review relates to the combination of various arrangements of data (Pittaway *et al.*, 2004) due to the various methods of collection used for the papers. Survey methods were used to generate quantitative results, but the majority of the case

study research papers have resulted in qualitative findings. This study, therefore, makes use of qualitative analysis to sort and analyse the main categories in the literature, instead of meta-analysis, which is more popularly used in medical science (Tranfield et al., 2003).

2.2 Section 2: Organizational culture

As discussed in section One, organisational culture is considered as the main factor in effecting lean implementation. In this section, the organisational culture (OC) will be more fully discussed related to lean implementation, discussing the what is culture, national culture and organisational culture. in addition, models and assessment of organisational culture. Finally, how organisational culture can affect lean implementation by identified the enablers and inhibitors of organisational culture.

2.2.1 Culture

National culture and corporate or OC share some overlap, since the members of the company are also members of the same national culture (Schein, 1984). Goldstein (1957) notes that neither the nominal definition of culture nor the synoptic definition is much help when trying to grasp the meaning of a term with so many variables:

Definitions...are usually intended to serve one or another of three distinct aims. Of these, the first [nominal definition] may be useful, the second [synoptical definition] is rather futile, and the third [essential definition] entirely pernicious (Goldstein, 1957, p. 1075).

Philosophers have suggested that culture is primarily defined by language (Lazăr, 2010), but corporations do not have a 'language' – although efforts to create one have been made (Fredriksson et al., 2006). Although we live in an increasingly globalised world (Held and McGrew, 2000), national and local culture still has a large influence on the way that businesses are run and operated. According to Davis (1985) culture is defined as 'The pattern of shared beliefs and values that give members of an institution meaning, and provide with the rules for behaviour in their organisation' (Sun, 2008, p. 138).

2.2.2 National culture

Cross-cultural management is steadily growing (Brannen, 2015) but the differences between East and West, North and South (Lundestad, 1997) are still

essential differences in business. The culture of the KSA, for instance, is Islamic, and this affects the regional economy (Kuran, 1993; Black, 2011) at a very basic or fundamental level. In addition, working hours vary in different cultures and climates, and the Islamic culture of prayer breaks is unimaginable in a Western Christian culture (The Telegraph, 2012). Even apparently obvious words, like 'teamwork' also can have different meanings in different cultures (Gibson and Zellmer-Bruhn, 2001), so that an American management manual or approach could be considered in a very different way within the KSA; essentially, culture is relative (Tilley, 2000).

Companies which operate internationally need to overcome the differences in order to communicate (Wood, 2011), but this will never be easy in a world where even 'Human Rights' has different cultural connotations (Cruft, 2005). This is why Halliday (2000) suggests that, in business, global governance will always encounter endless difficulties and why terms like 'Corporate Social Responsibility' (CSR) (Burke and Logsdon, 1996) have such broad terms of reference. Trying to reconcile these things with local or national culture is an art. Studying culture helps to explain many kinds of outcomes, and it serves as a reminder that the contrasts in people's behaviour is often attributed to cultural differences.

2.2.3 National culture influence on organizational culture

According to Hofstede et al. (1991) culture influences the way in which people behave, so similarly it is important to understand the culture of an organisation. Podrug (2011) suggest that a person's decision-making process is dependent on their cultural background in terms of what is considered 'the right way' to do things, highlighting the importance of national culture to OC (Podrug, 2011). According to Francesco and Gold, (2005) success in the current-day economy is heavily reliant on understanding cultural values and their influence on organisations and the behaviours that occur within them. Podrug (2011) discovered a positive correlation between national culture and the decision-making styles of leaders in organisations. According to Newman and Nollen (1996), the idea of universal human resource practices has been challenged, as

policies that work well in one country do not necessarily have the same effect in another. Furthermore, according to Schneider and De Meyer (1991), national cultures influence strategic decision-making and adopted styles of leadership. Countries with higher power distance scores, according to Hofstede's cultural dimensions, are more likely to accept feedback without disagreement or contesting the ideas from superiors than those with a lower power distance score, (Hofstede, 1980). This also has an impact on two-way communication flows within the organisation impacted by national culture, for instance, collectivist cultures favour group based training as opposed to one on one training; thus, it is recommended that to experience success, policies need to fit with the local cultural context (Dartey-Baah, 2013a).

2.2.4 Organizational culture

In the same way that national culture distinguishes characteristics between different countries, OC also distinguishes one company from another (Vijay, 1985). Kotter and Heskett (1992) suggest that OC impacts organisational performance. According to Siehl and Martin (1989), culture has an influence on the attitudes of individuals and employees in a company and in return impacts organisational effectiveness. There are a great number of studies that demonstrate the positive correlation between culture and organisational effectiveness (Quinn and Spreitzer, 1991; Gregory *et al.*, 2009). Studies have shown a relationship between OC as an asset that positively promotes company performance (Prajogo and McDermott, 2011).

Various definitions of OC exist yet there are a number of similarities, which include the framework established by Schein (1984), i.e. the existence of 'artefacts, values and beliefs and the behaviours which are commonly shared and accepted by members in the organisation' (Detert *et al.*, 2000, p. 851). One of the most well-known definitions of OC is, 'The way we do things around here' (Sun, 2009, p. 137). According to Brown (1998), OC can be defined as '...the pattern of beliefs, values, and learned ways of coping with experience that have developed during the course of an organisations history, and which tend to be

manifested in its material arrangements and in the behaviours of its members' (Sun, 2009, p. 137).

The research available on OC tends to deal with two main factors, the values and behaviours existing in the company and also how strongly these are exhibited throughout the organisation (Detert et al., 2000). According to Sørensen and Sorensen (2002), both types of values and beliefs in conjunction with how strongly they are abided by within the organisation are important determinants of competitive performance. Four themes have been identified in OC by Maull et al. (2001). The first one being, culture is a learned entity; this refers to culture being utilised as the right way for new members to behave thus, propelling development and ensuring survival of the organisation (Sun, 2008). Second, culture is seen as a belief system, and under this theme OC is divided into beliefs and daily beliefs; guiding beliefs provide the context in which the practical beliefs of daily life occur (ibid.).

Third, culture is viewed as a strategy. Although Bate (1995) does not agree with a distinction drawn between culture and strategy. He suggests, strategy in itself is in fact a cultural phenomenon. This would lead to two inferences: first, that any sort of strategy formulation is a cultural activity, and second, all cultural changes would therefore be considered strategic changes (Sun, 2008). Although according to Sun (2008) 'Any cultural programme in an organisation is not separate because any change to the cultural program occurs during formal and informal strategic planning processes' (p. 138).

The fourth theme sees culture as mental programming. This can be seen through Hofstede's definition of culture as, 'collective programming of the mind, which distinguishes the members of one category of people from another,' (Hofstede, 1991, p. 5).

Interestingly the understanding of OC and its impact on company performance has been adapting over the decades, (Sørensen and Sorensen, 2002). Peters and Waterman (1982) having identified a correlation between a solid OC and successful company and financial results. However, later on Kotter and Heskett (1992) further added to this by discovering that not only was a strong OC

important for company performance but that it should also be adaptive in order to achieve 'superior performance'. An important aspect to consider when discussing OC is the multidimensional relationship that connects OC and the performance of the company (Kotter and Heskett, 1992). Its impact is far reaching as it involves a number of areas which relate to the organisation's competitive performance (ibid.). Porter (1985) reinforces the notion of achieving the right fit between OC and a specific type of organisational performance. Prior research that embodies the role of OC influence on performance has been highlighted in numerous studies (Dale and Cooper, 1992; Oackland, 1995; Thomas, 1995; Wilkinson et al., 1998; Stock et al., 2007). According to Ouchi (1981), significant contrasts can be identified between the corporate structures of America and Japan. Japanese companies tend to be characterised with great labour force stability and utilising democratic decision-making processes (Mehri, 2006). Furthermore, respect for people is at the cornerstone of their OC and successful lean implementation (Mehri, 2006; Alkhoraif and Mclaughlin, 2017).

2.2.5 Models of organizational culture

Cultural models help to identify patterns of basic issues resulting in poor functioning of groups and peoples (Shi and Wang, 2011). Hofstede's model and Trompenaars's model help to provide researchers guidance as to the structure of national cultures, (Shi and Wang, 2011). While there are numerous criticisms of Hofstede's research, his cultural dimensions have had a significant influence on the field of international business and business management ((Shi and Wang, 2011). The following sections represent models of organisational culture.

2.2.5.1 Nadler and Tushman-Congruence Model

The Nadler and Tushman model proposes four elements of organisational anatomy: the people component, organisational structure, culture and work tasks. The model assists in identifying the root drivers of organisational performance (see Figure 2-6).

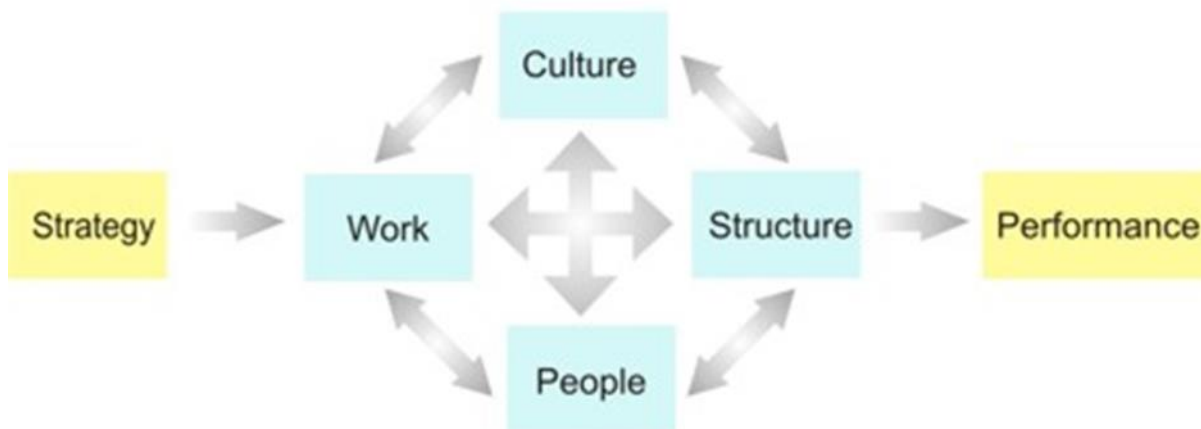


Figure 2-6 Congruence Model

(Source: Nadler and Tushman, 1989)

The people component refers to the people in the organisation/company, their personal attributes such as personality, abilities and motivation. The task component refers to the job tasks and how they are co-ordinated. The formal organisation structure is made up of the framework, levels and processes and operations of the company (Gibson and Barsade, 2003). The internal politics and culture can be witnessed in this component. Nadler and Tushman (1980) emphasise that if an incongruence occurs between the four components this will cause the organisation to struggle.

An advantage of this model is that it serves as a reminder that changes or even errors in one area of the organisation will have an effect on the other components of the organisation (Nadler and Tushman, 1989).

2.2.5.2 Schein's Model (1984)

Schein's model suggests that OC is established from a group working together and developing patterns as they collaborate to solve problems and ensure organisational survival (McLaughlin et al., 2010). His model (see Figure 2-7) is comprised of three levels. First, artefacts that are the objects and elements that can be seen or experienced such as the company building and logos, the processes, communication. Second, espoused values that are comprised of the principles and standards within an organisation belonging to their employees

(Schein, 1984). These describe what is considered important by the organisation. Finally, underlying assumptions refer to beliefs, thoughts and feelings. Schein's model emphasises the way in which artefacts and values can expose things regarding to underlying assumptions (E. H. Schein, 1990a).

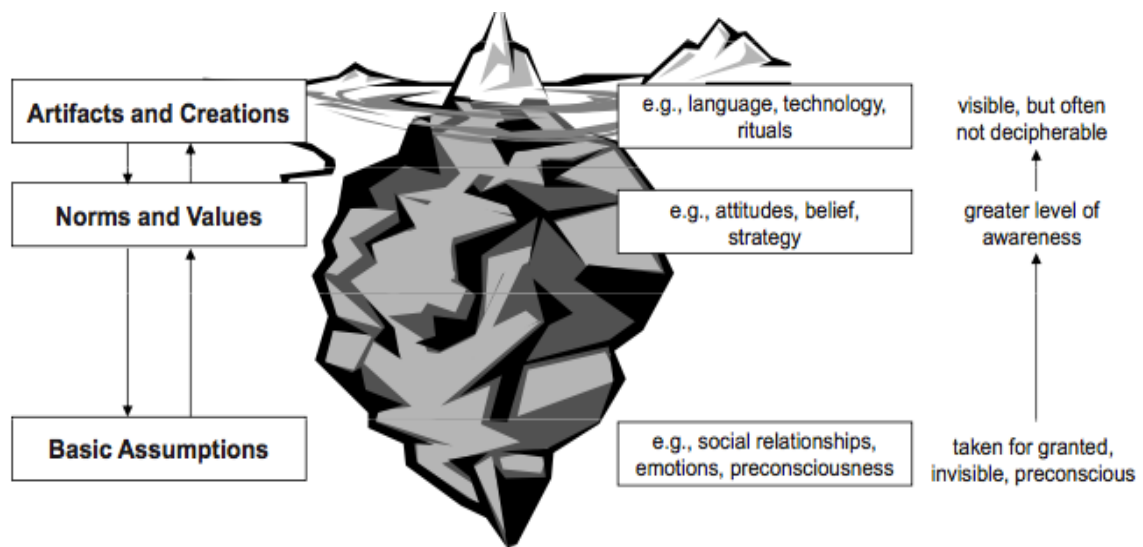


Figure 2-7 Schein's Three Levels of Culture – Visible and invisible interactions
 (Source: Schein, 1984, p. 4)

Schein suggests that one should be careful when interpreting 'behavioural regularities' because they can reflect the environment equally to the culture and therefore should not be considered the only indicator of underlying assumptions and culture (Schein, 1985). The importance emphasised by Schein is that many of these behaviours can occur quite unconsciously. Therefore, this model provides some guidance for culture assessment however, it cannot encompass the strength of that culture (Gray, 1998). This is highly relevant to the research for this project as at its essence is the chain reaction of OC on lean implementation in SMEs in the KSA.

2.2.5.3 Sociability and solidarity model

Goffee and Jones, (1998) consider OC similarly as 'communities' and divided them into two categories of human relations: sociability and solidarity. Their matrix has been organised into the following sections (see Figure 2-8). First,

networked organisations tend to have little hierarchy and rather greater emphasis on social groups and friendships within the organisation (Goffee and Jones, 1996). The Mercenary OC is quite opposite to the networked culture. Instead it has a clearly organised hierarchy and a clear distinction between work life and social/personal life. A fragmented culture displays low levels of personal and professional relationships with little group work and higher levels of solitude (Axelrod et al., 2006). The communal OC exhibits higher levels of integration than a networked culture with highly informal relations between employees and a higher level of social relationships and caring between those in an organisation with very limited hierarchies (Axelrod et al., 1998).

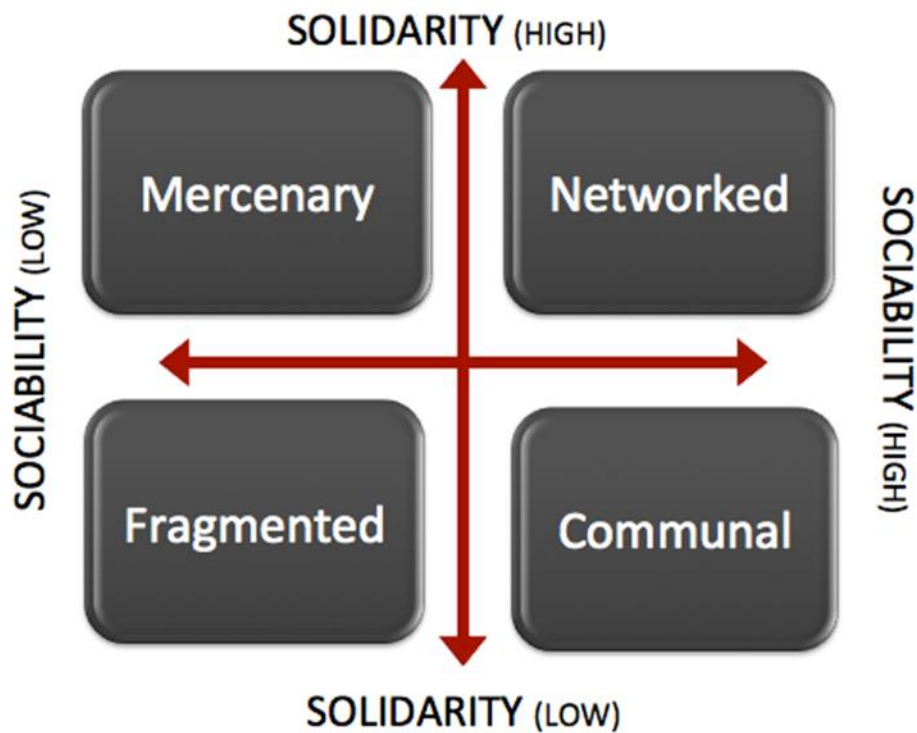


Figure 2-8 Sociability and solidarity model

(Source: Goffee and Jones, 1998)

Goffee and Jones suggest that senior management should establish a type of OC that best suits the business environment. The authors highlight the importance of understanding the impact that sociability and solidarity can have on the company in terms of attracting the best employees (Goffee and Jones, 1996).

2.2.5.4 Competing Values Framework

The competing values framework developed by Quinn and Spreitzer (1991) that encapsulates four different cultural dimensions (see Figure 2-9). This framework is particularly useful in demonstrating how OC dimensions can impact performance sectors within the organisation (Prajogo and McDermott, 2011).

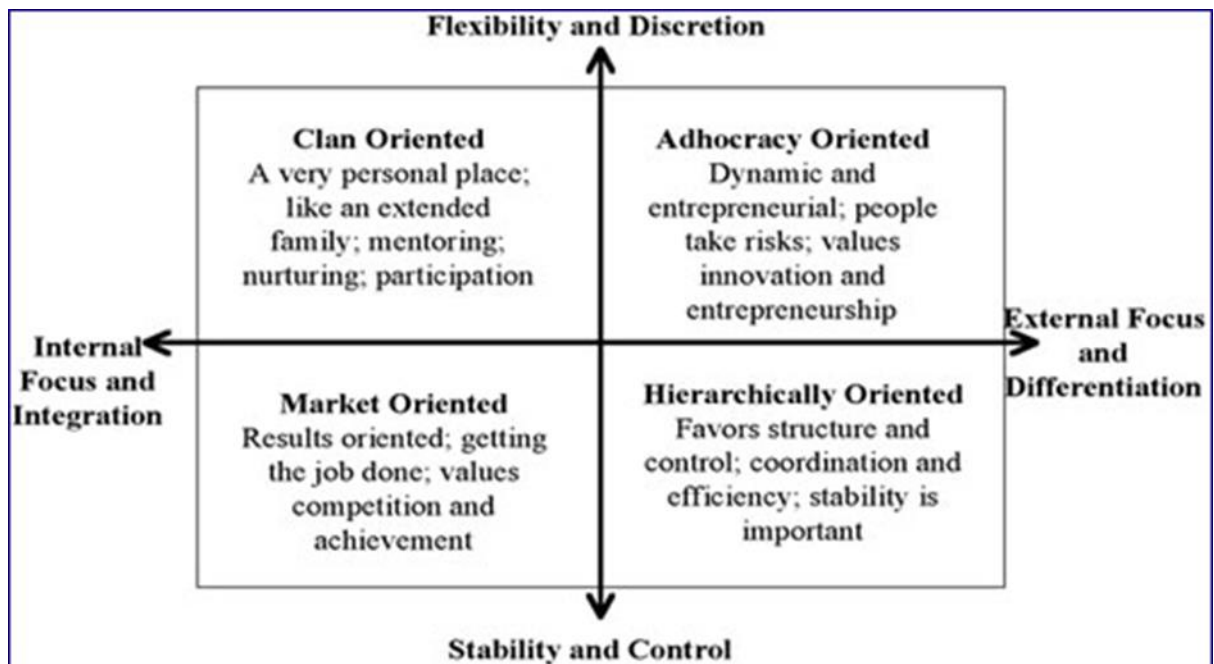


Figure 2-9 Competing Values Framework

(Source: Cameron and Quinn, 2005).

Cameron and Quinn's culture assessment model was established as response from the transition from the industrial to the information age to meet greater competitive pressures (Cameron and Quinn, 2005). Furthermore, a difficulty in current research that has been highlighted via application of the competing values framework and is worth consideration when discussing lean strategy in manufacturing companies is that high quality standards tend to be associated with carefully meeting specifications and control in numerous areas with attention to detail and maintaining a high standard (Cameron, 1994). However, flexibility is more associated with teamwork and empowerment and giving more degree of autonomy to employees and this autonomy is also largely associated with lean concepts (Cameron, 1994). Thus, the model also helps to uncover

where competing factors might arise. This model is set on a continuum, the first being flexibility to focus or control. This represents two opposing methods reflecting the organisation's ability to open themselves up to spontaneous opportunities and development and on the other end of the continuum reflects a higher degree of stability (Quinn and Spreitzer, 1991).

The other dimension is the internal to external continuum. The model shows high flexibility and an external focus in which creativity is a major focus and a way of dealing with uncertainty (Cameron and Freeman, 1991). This type of organisation has a greater likelihood for favouring high technology or more risky projects as a result of the business environment. This reflects two other methods adopted in a company, one being maintaining and improving on what already is present in the organisation and the other on responding and adapting to the external environment. Although these categories are relatively stereotypical, it is not uncommon for organisations to exhibit attributes from other categories also (Cameron, 1994). It is a useful model in order to understand OC and in terms of analysing drivers and inhibitors to company performance and the drivers and inhibitors for lean implementation within the organisation (Cameron and Freeman, 1991).

Furthermore, a difficulty in current research is high quality standards tends to be associated with carefully meeting specifications and control in numerous areas with attention to detail and maintaining a high standard (Cameron and Quinn, 2005). However, flexibility is more associated with teamwork and empowerment and giving more degree of autonomy to employees and this autonomy is also largely associated with lean concepts (Quinn and Spreitzer, 1991). Thus, the model also helps to uncover where competing factors might arise. The value of utilising this model is that it includes flexibility and control are crucial for evaluating how certain aspects of OCs are necessary for achieving certain organisational goals..

2.2.5.5 Culture Web

The cultural web by Johnson and Scholes (2001) consists of seven key elements that are interlinked (see Figure 2-10). The centre, which is the

paradigm, consists of commonly held beliefs and values within the organisation (Scholes and Johnson, 2001). Around the paradigm are seven elements which can be established at various stages during the development of the organisation (Sun, 2008). These assumptions, beliefs and values are most often set by leaders in the organisation resulting in a guidance for behaviours considered appropriate in the company (Sun, 2008).

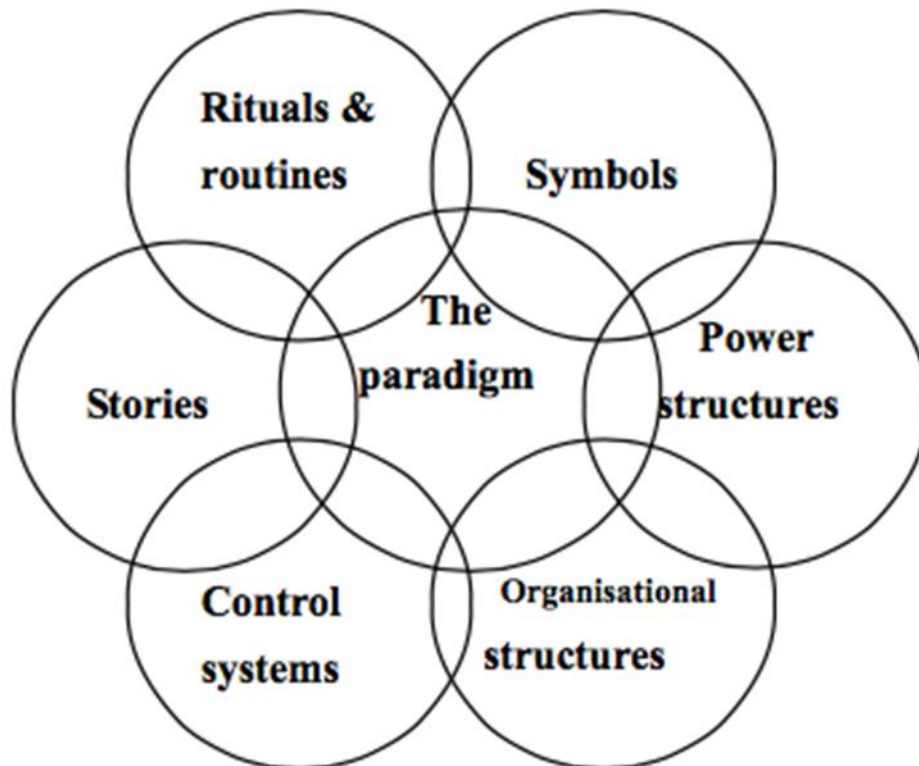


Figure 2-10 Cultural Web

Source: (Scholes and Johnson, 2001)

2.2.6 Assessing culture

The famous American information technology company IBM utilises a system known as the OC inventory tool in order to detect aspects within their OC which require some change (Mann, 2009). IBM have discovered that having the support and commitment of senior management and employee involvement are key aspects which drive the success of lean practices. This is further reinforced by Mann (2009), who identifies that implementation of lean tools only accounts

for 20% of the implementation of 'lean' per se in an organisation. The remaining 80% is dependent on leadership style and behaviour. This is highly dependent on the commitment and influence from senior management to initiate and propel this remaining 80% to success (Mann, 2009). There are a number of theories and models that are useful in terms of assessing culture in terms of national and or OC. These are outlined below, stating the benefits of their application to the study.

2.2.6.1 Hofstede Dimensions

Hofstede's cultural dimensions assist in categorising areas in which cultures might deal with differently. These include collectivism vs. individualism, masculinity vs. femininity, uncertainty avoidance, power distance and long-term orientation (Hofstede, 2011). These can not only be applied to national culture assessment but also OC assessment, determining how collectivist vs. individualist OCs influence organisational performance. Furthermore, it serves as a way of identifying prevailing attitudes within an organisation that impact on managerial and employee behaviour and relations. Hofstede's dimension was researched among 76 different countries, which makes it rather extensive and useful in terms of measuring national culture. Although it should be noted that his methodology included employees from IBM, who are generally middle class educated people and thus not necessarily totally representative of the entire population of the country (Shaiq, 2011). Despite this, it provides a solid theoretical framework from which to assess national culture and can be applied to OC.

2.2.6.2 Trompenaars Dimensions

Trompenaars and Hampden-Turner (1997) aimed to help investigate national culture with their cultural dimensions and understand why a number of management processes become less effective when transferred into other cultures (see Figure 2-11). Their work was a natural extension of Hofstede's as there is some overlap in a few dimensions but a few other dimensions added enabling the inclusion of other factors, (Trompenaars and Hampden-Turner, 1997).

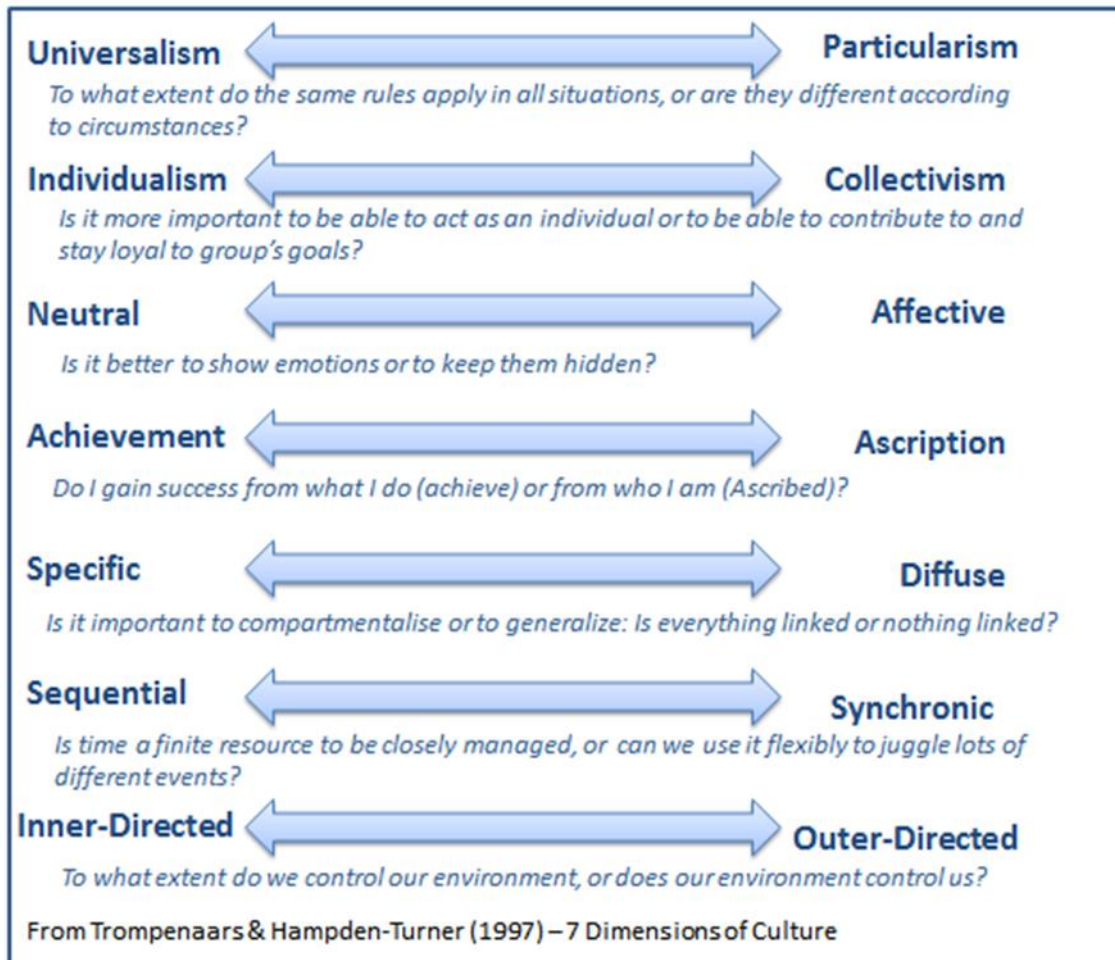


Figure 2-11 Trompenaars Cultural Dimensions

(Source: Trompenaars and Hampden-Turner, 1997)

Modern managers may fall into the trap of thinking that if they follow a series of steps and instructions they can achieve the same results realised by another (Gregory *et al.*, 2009). Because of the mistake in assuming the universality of business principles and practice, SMEs may likely adopt a philosophy such as the lean principles and not understand why it has not succeeded as it should, (Smith *et al.*, 1996). His emphasis is essentially that there is no one best way of doing something. The importance is to not get caught up in the processes. For example the implementation of a ‘chain of command’ might be interpreted as ‘family in another culture thus generating different results’ (Gregory *et al.*, 2009). Keeping this in mind Trompenaars’s cultural dimensions are useful in terms of contextualising lean processes in accordance with manufacturing in the KSA

and SMEs. The Trompenaars and Hampden also suggests that culture occurs on numerous levels therefore his cultural dimensions are designed to be applicable not only to national culture but OC also (Smith et al., 1996). A study conducted by Trompenaars and Hampden-Turner (1997) asked groups of professionals from a variety of different countries to select which statement best describes how they would define an organisation:

A. 'One way is to see a company as a system designed to perform functions and tasks in an efficient way. People are hired to perform these functions with the help of machines and other equipment. They are paid for the tasks they perform.'

B. 'A second way is to see a company as a group of people working together. They have social relations with other people and with the organisation. The functioning is dependent on these relations.' (Trompenaars and Hampden-Turner, 1997)

The results revealed that only slightly over a third of respondents viewed an organisation as a system as opposed to a social group or family in France and Asia. The English-speaking countries were rather divided on the definitions and most of the Eastern European countries and Russia tended towards defining an organisation as a system (Trompenaars and Hampden-Turner, 1997).

2.2.7 Organizational culture and Lean management

Organisational culture has its impact on company performance because it impacts actions and behaviours (Calori and Sarnin, 1991). Research conducted by Bortolotti et al. (2015) emphasises lean implementation factors revolving around OC and soft practices. A number of researchers have identified OC as the reason behind a lack of effectiveness regarding lean management (Liker, 2004; Sim and Rogers, 2008a; Atkinson, 2010; Liker and Rother, 2011). From this, OC has been researched in the context of its impact on total quality management and just-in-time inventories (Yasin et al., 2003; Prajogo and McDermott, 2005; Naor et al., 2008; Baird et al., 2011).

Yet these studies only address bits and pieces of lean management and they are relatively limited (Caffyn, 1999). According to (Bortolotti, Boscarri and Danese, 2015), significant limitations in these studies include the narrow criteria or OC utilised and lean practices. Furthermore, the view of lean management utilised in these studies was not one of a holistic view of 'leanness' as a philosophy. Another important area for which (Bortolotti, Boscarri and Danese, 2015) advocate is to give enough focus on soft practices. This is further reinforced by who suggest that lean management is comprised of both soft and hard practices. Soft practices refer to people and the relationships within the organisation and hard practices are concerned with the more technical aspects of lean practices (Shah and Ward, (2007). Samson and Terziovski (1999) emphasise that soft practices are critical in reaching superior results through lean management. According to Liker and Rother (2011), many companies tend to not give equal emphasis to the soft practices of lean management as they do towards the hard practices.

2.2.8 Change organizational culture

There are three models that are used as examples in the study of change management (Mento, Jones and Dirndorfer, 2002). The first is Kotter's model (2009), which consists of eight stages that can be used to transforming firms. Kotter explains that most change implementations fail but that his model is an effective method of circumventing the biggest problems during the transformation. This model has two main lessons: that there are phases that a company goes through during the change process; and that major problems at any stage can have a huge impact on the flow of the change process.

The second model is a tactical-level model by Dick (1995) for the implementation of organisational change. This includes a ten-stage system for assisting companies to implement change programmes and for assessing their progress while the change is in motion. Dick explains that change is both a skill and a process and that the method of implementation is as crucial as the actual change. He further states that change needs to be continuous and connected procedure.

The third method is Garvin's method (2012), which consists of a seven-stage process. This method was successfully used in the US company, General Electric (GE). This model was based on Lewin's (1946) model of unfreezing, movement and re-freezing activities. Garvin concentrated on the role of management for generating impetus for change, building and sharing the idea, directing the change, assessing the change process and re-freezing the change process within the organisation. Re-freezing consists of changing the design aspects of the company, in other words, putting systems and procedures in place to encourage change. Akgün (2006) agreed with the importance of generating an impetus for change as it encourages unlearning, which can help prevent inflexibility and a stringent adherence to current practices and procedures.

Bates (1995, p. 3) explained that when change occurs there isn't usually a specific beginning, middle or end to the process and no-one can agree on what happened, if anything. Alvesson (2012) states that a change in culture needs imagination, creativity, insight, understanding, comprehension, tools and methods concentrating on the culture, and determination. Finally, luck (2012, p. 185). Morgan (1997) proposes the concept of chaos theory (Gleick, 2011) as a solution for cultural change.

Several theories regard cultural change as being separate from the original change that is trying to change. Ouchi (1981) proposes one method of transforming from type-A to type-Z cultures. Lundberg (1985) puts forward quite a complex opinion of cultural change but proposes a single method of change for all types of cultures. There are two views on what organisational culture is: what a company has; and what a company is (Smircich, 1983). Although very different approaches, neither consider the background or previous culture of the company into account. A rare opinion was proposed by Schein (2004) when he believed that all cultures change in a related manner (Wilkins and Dyer, 1988).

It has been discussed that in order to change a culture, strong leadership and dedication are necessary, but this must not happen from the top down (Bate, 1995). Senior management leadership is not conducive to Lean (DeTienne and

Koberg, 2002). Instead, participation from across the company is necessary for culture change (Dick, 1995; Kotter, 2009; Al-najem, 2014). This includes employee contributions, encouragement for the innovators, removal of obstacles and demonstrating faith and commitment to the teams. Management cannot ask the questions “how” and “why”, but instead need to encourage the queries, investigations and experimentations, while acceding to the insecurity and ambiguity of such an environment (Martins and Terblanche, 2003).

Teamwork is a crucial component of the change process (Tranfield *et al.*, 1999). Introducing a programme for change for Lean includes determined efforts, dedication and management resolution (Al-Najem, (2012). In order for culture to change, senior management needs to re-evaluate the current culture and accept that change is needed (Fitzgerald, 1988). Studies have been written based on the importance of leadership for the management of implementing significant company changes (Collins, 2005; Beckhard R., 2009), while others have highlighted the importance of visualisation skills of senior managers during change management (Carter, L., Giber, D.J. and Goldsmith, 2001). Tesluk *et al.* (1997) state that a vital aspect of culture change is the ability of senior managers to outline an enduring goal for the company, established on theories of creativeness. The presence of a ‘championing’ leader is a core component for change. These leaders are consistent in their efforts, firmly believe in the process and are an example of the Lean management characteristics within the company (Beer and Walton, 1987). Al-Najem *et al.* (2012) have identified that total support is necessary for reducing any opposition to change and that these types of leaders are typical of companies that encourage the implementation of Lean. Owner-led leadership has been acknowledged as very different to management-led leadership. Owners have a high degree of control, are impetuous and emotional who are very good at encouraging loyalty and enthusiasm among their staff. Managers are more clinical and use management tools to plan and organise their processes. Obviously, the difference in approaches have very different influences on staff and company culture (Dyer, 1997) and any plans devised for implementing and maintaining change need to

consider the leadership component from the very beginning (Alkhoraif and Mclaughlin, 2017).

Apathy or inertia are extremely detrimental to the progression of a culture change effort. This explains when companies stick to old methods despite external pressures to innovate. Resistance would be a similar characteristic as both are barriers to the progress of change but occur at varying levels of investigation. Common resisting attitudes and performances make up company inertia (Wong-Mingji and Millette, 2002). The behaviour where people refuse to give up an out-dated method or approach, despite advice to the contrary, is known as the 'Einstellung effect' and this is usually associated with the company's culture (Bate, 1995). Bate's method of changing culture includes a process where the current culture needs to be disassembled, reconciled, educated in new methods and then these need to be accepted. This agrees with Lewin's (1947) unfreeze, change and refreeze model.

However, Lewin's change model does not take into account that the external economy that a company operates in when it 'refreezes' can be different when it 'unfreezes' and instead assumes that there is no change. This model also presumes a method where one stage consecutively follows the previous one, etc. (Styhre, 2002). The current view of organisational culture as fluid and innovative (Hatch, 1993) has reduced the use of Lewin's model with its simple explanation of one-by-one stages. It is still relevant, however, with the corresponding view of generating change through a disturbance that initiates change to then become the norm appearing in Lewin's model. Changes that are introduced to the characteristics levels (E. Schein, 1990) can still effect beliefs that drive the adopted behaviours. An initial disturbance in the norm is still necessary to initiate the change implementation as this norm maintains a way of thinking and behaviour that could form a huge barrier to change. Change can only occur through rational consideration of the core beliefs and perceptions and the resulting behaviours, that become the new norm, when the changes are implemented (Schein, 2004).

2.2.9 Organizational culture enablers and inhibits in Lean implementation

Pakdil and Leonard (2015) suggest a number of organisational factors that create the cultural infrastructure of a company and impact the success of lean management. These factors include: 'employee involvement, creativity, problem-solving processes, decentralisation, control and standardisation, efficiency, productivity and continuous improvement' (Pakdil and Leonard, 2015a, p. 726). (Liker, 2004) suggests that two key elements present in LCs are continuous improvement and care for employees and relationships. Naor et al. (2008) suggests that a LC needs well-trained human resources to foster improvement and knowledge sharing in order to leverage leanness as a competitive advantage.

In regards to understanding more about LC at higher levels in the organisation, Saha et al. (2014) identify the importance of establishing lean transformation initiatives to create an LC within the organisation to support the lean processes on the factory floor. They identify the following 'social areas' which need adjustment in order to take on a lean philosophy and transition to a LC, (Flinchbaugh, 2004). Leadership behaviour and style is of particular importance in conjunction with strategies which are geared towards encouraging LC. Saha et al. (2014) identify an important aspect that compliments the work of Angelis et al. (2010) in terms of the discussion of employee commitment. Saha et al., who researched lean implementation in server manufacturing, suggest that the altering of employee mindsets and trains of thought and the company's willingness to embrace lean transformation contributes for 80% of successful implementation in the company.

The soft lean aspects are considered critical factors for the success of lean implementation (Saha et al. 2014). While a LC has been recognised as providing improvements in production, its failure has often been due to not enough emphasis being placed on soft lean aspects (Al-Najem et al., 2012). The role of senior management is critical in initiating and sustaining an LC within the organisation, encompassing areas such as the development and

implementation of a framework and process that can pre-empt and deal with issues of lean transformation across departments. (Swank, 2003). The aim is to improve the chances for the success of sustainable improvements to processes lasting beyond just the duration of a project but for the long term (ibid.).

Research conducted by Singh and Singh (2012) highlights how LC and continuous improvement is manifested at a task level within the organisation. As identified in lean philosophy, continuous improvement also tends to advocate team work; however, in addition to this each individual worker is also encouraged to show areas for improvement in their day-to-day tasks and to communicate and provide suggestions on how things can be made better (Detert et al., 2000). Furthermore, these regular team discussions are held in order to identify areas of weakness within the processes and brainstorm about solutions. Furthermore, central to the continuous improvement is the principal of a customer-driven outlook for improvement. This is complementary to the customer added-value principle in LC (Singh and Singh, 2012). Within this continuous improvement the success of the company depends highly upon the customer (Prajogo and McDermott, 2011) Therefore, the aim is to go beyond customer expectations.

Continuous improvement is founded upon the active participation of people; this means knowledge sharing, training, and growth are all given high priority, (Fullerton and McWatters, 2001). Continuous improvement emphasises the consideration of the entire process and the end result rather than too much internal focus within isolated departments (Prajogo and McDermott, 2011). It advocates the co-operation of horizontal processes similarly to the customer value-added principle encouraging horizontal communication (Fullerton and McWatters, 2001).

Design improvements are not only considered at a product level but also encompassing a service level and identifying areas for improvement sooner as opposed to later, which incurs greater costs (Prajogo and McDermott, 2011). Factual decision making, which requires thorough investigation at all levels, is

central to continual improvement, thus strong participation of feedback from task level staff is often necessary (Imai, 1997).

Partnership developments are also an important factor in continuous improvement as relationship building both internally and with external suppliers and contractors is often essential to ensuring the smooth running of projects (Imai, 1997). Matsui (2007) suggests that the effectiveness of hard lean practices are significantly increased when teamed equally with the soft practices which include human resources management (HRM), customer feedback, as well as supplier, management and leadership support. However, studies suggest that no single organisational profile guarantees success (Denison and Mishra, 1995; Prajogo and McDermott, 2011; Bortolotti et al., 2015). Rather, what is suggested is the establishment of diverse and varied OC profiles that leverage a particular management process or improvement program (Detert et al., 2000). There are a number of situations which exemplify how specific OC dimensions are linked to different and at times opposing performance outcomes (Fey and Denison, 2003). Furthermore, it has been noted that a high power distance has an adverse effect on employee empowerment and autonomy, while higher levels of uncertainty avoidance and organisational collectivism have a positive correlation with improvement projects, (Prajogo and McDermott, 2011).

Higher levels of group collectivism and long term orientation are considered to significantly and positively impact on operational performance, (Lozeau et al., 2002). According to Lozeau et al. (2002), if a misfit between OC and organisational practices happens this leads to a reduction in performance improvements. Liker (2004) has discussed Toyota's OC according to 14 principles, while Rother (2009) has discussed Toyota's OC in terms of continuous improvement. While neither Rother or Liker utilised an extensive OC model they did highlight certain attributes which are consistent with OC such as fairness and values encouraging co-operation and closer ties between the company and its suppliers in addition to a strong focus on continuous improvement (Bessant and Caffyn, 1997). According to Wincel and Kull (2013),

LC will probably be ever evolving as organisations gradually master its implementation.

The study conducted by Bortolotti, Boscari and Danese (2015) discovered that OCs that experienced more successful results from lean implementation possessed the following characteristics: a high organisational collectivism, long-term and humane orientations, combined with lower levels of assertiveness. Their research suggests that it is not the hard practices that differentiate successful LI but the soft practices. They discovered that increased levels of humane orientation and lower assertiveness were essential for maximising results from employees in order for process improvements (Rother, 2009). However, (Bortolotti, et al., 2015) suggest that future research is needed into the specific role that each OC factor has in implementing lean management. This is in particular the case because many of the same OC characteristics were discovered in high performing non-lean plants in their study. Thus they could not attribute these as being exclusively important to lean management (Bhasin and Burcher, 2006). However, they believe these findings can significantly add to the discussion on if there is an OC profile which best facilitates the success of LC (Bortolotti et al., 2013).

It was however discovered and confirmed by (Naor *et al.*, 2008) that assertiveness was apparently the only characteristic which specifically distinguished successful lean plants. This can be attributed to the fact that low assertiveness allows better co-operation between departments reducing obstacles inhibiting cross-functional collaboration and integration (Shah and Ward, 2007). Tables 2-11 and 2-12 provide an overview of the literature review showing enablers and inhibitors of OC aspects in lean implementation (Alkhoraif and McLaughlin, 2016; Alkhoraif and McLaughlin, 2017).

Table 2-11 Lean Implementation Enablers

Lean Implementation enabler	References
• Support of senior management	<i>(Achanga et al., 2006b; Panizzolo et al., 2012)</i>
• Training for senior management	<i>(Achanga et al., 2006b; Panizzolo et al., 2012)</i>
• Positive / Strong relationships between workers.	<i>(Hu et al., 2015)</i>
• Employee commitment	<i>(Angelis et al., 2011)</i>
• Implementing Lean as a philosophical function	<i>(Hines, Holweg and Rich, 2004b; Bhasin and Burcher, 2006; Shah and Ward, 2007)</i>
• Lean in social aspects (soft lean practices) are important for success	<i>(MacDuffie and Helper, 1997; Brown, et al., 2000; Schonberger, 2007; Olivella, et al., 2008)</i>
• Employee productiveness is especially good for improvement projects	<i>(Fullerton and McWatters, 2001; Bhasin and Burcher, 2006; Schonberger, 2007)</i>
• Employee participation and knowledge sharing	<i>(Angelis et al., 2011)</i>
• Developing employees as an integral part of organisation leading to a sense of job security enhancing employee commitment	<i>(Womack et al., 1990)</i>
• Environment which enhances employee commitment is imperative	<i>(Munene, 1995; Dixon, 1999)</i>
• Support of senior management and middle management	<i>(Womack and Jones, 1996)</i>
• Clear demonstrations of organisational support for workers	<i>(Angelis et al., 2011)</i>
• Provision of appropriate tools, processes etc. to support lean implementation by employees	<i>(Womack and Jones, 1996; Womack, J., and Jones, 2003)</i>
• Knowledge sharing systems	<i>(Womack and Jones, 1996; Shah, 2003; Womack, J., and Jones, 2003; Shah and Ward, 2007; Angelis et al., 2011)</i>
• Job rotation to help increase skill base and mitigate pressure of overtime on a small pool of employees	<i>(Shah, 2003; Shah and Ward, 2007)</i>
• Fairness in the workplace	<i>(Angelis et al., 2011)</i>
• Preparation of employees into transition of lean systems and philosophy to reduce anxiety and stress from fear of change	<i>(Allen and Meyer, 1997)</i>
• Provide sufficient support and training for employees	<i>(Allen and Meyer, 1997)</i>
• Horizontal communication and co-operation between departments and department objectives	<i>(Mann, 2009)</i>
• Vertical two-way communication between upper management and task level employees	<i>(Mann, 2009)</i>
• Lean culture reinforced by management attitudes and behaviours	<i>(Mann, 2009)</i>
• Emphasis on continuous improvement	<i>(Imai, 1997; Naor et al., 2008)</i>
• Strong emphasis on customer added-value as goal	<i>(Prajogo and McDermott, 2005)</i>
• Collective organisational culture	<i>(Bortolotti, Boscari and Danese, 2015)</i>

Table 2-12 Lean Implementation Inhibitors

Lean Implementation inhibitor	References
<ul style="list-style-type: none"> Lack of management support / commitment 	(Al-Najem, et al, 2012)
<ul style="list-style-type: none"> Role ambiguity 	(Angelis et al., 2011)
<ul style="list-style-type: none"> Lack of realisation that Lean philosophy is a high maintenance system, cannot be just implemented and left to own devices 	(Bhasin and Burcher, 2006; Bhasin, 2012)
<ul style="list-style-type: none"> Too much emphasis on one factor over another, for example speed over quality or vice versa 	(Bessant and Caffyn, 1997)
<ul style="list-style-type: none"> Overtime pressure falling on only a few workers due to skill set 	(Shah, 2003; Shah and Ward, 2007)
<ul style="list-style-type: none"> General feeling of unfair practices and policies existing throughout the organisation. 	(Angelis et al., 2011)
<ul style="list-style-type: none"> Reluctance to stop a production set to deal with a fault in a product. 	(Crofton and Dale, 1996)
<ul style="list-style-type: none"> The development of a 'blame' culture. 	(Angelis et al., 2011)
<ul style="list-style-type: none"> Lack of appropriate / necessary equipment to perform the job task well leads to a reduction in employee commitment. 	(Shah, 2003; Shah and Ward, 2007)
<ul style="list-style-type: none"> Disruptions to work flow leads to frustration in workers and reduces employee morale. 	(Swank, 2003)
<ul style="list-style-type: none"> Employees' unwillingness to socialise with other colleagues also reflects inability to work in teams and reluctance to participate in improvement projects. 	(Angelis et al., 2011)
<ul style="list-style-type: none"> Poor planning. 	(Womack and Jones, 1996; Womack, J., and Jones, 2003)
<ul style="list-style-type: none"> General low employee morale. 	(Angelis et al., 2011)
<ul style="list-style-type: none"> Lack of appropriate key performance indicators. 	(Yan-jiang, Lang and Xiao-na, 2006)
<ul style="list-style-type: none"> Adoption of a 'one size fits all' approach to LI. 	(Womack and Jones, 1996; Shah, 2003; Womack, J., and Jones, 2003; Shah and Ward, 2007)
<ul style="list-style-type: none"> Inappropriate reward system. 	(Alsyouf et al., 2011)
<ul style="list-style-type: none"> Too much emphasis on internal departmental boundaries and objectives. 	(Mann, 2014)
<ul style="list-style-type: none"> Incorrect Lean assessment of the source of waste. 	(Achanga et al., 2006b; Ihezic, 2009)
<ul style="list-style-type: none"> Lean consultants, providing financial assistance for training 	(Jadhav et al., 2014)
<ul style="list-style-type: none"> Job security 	(Marodin and Saurin, 2013)

2.2.10 Summary

In summary, understanding OC and its influence on employees and organisational effectiveness is aided by use of models and theories such as Nadler and Tushman's Congruence model; the competing values framework models of Schein, Goffee and Jones, and Cameron and Quinn; as well as the models of Hofstede and Trompenaars. Emphasised by the models is the importance of establishing an OC suitable to the business environment (Goffee and Jones, 1996). Furthermore, they can also help to identify areas within the organisation that act as drivers or inhibitors for specific behaviours that can block or support desired results (Cameron, 1994). This is further reinforced by the study conducted by Nazarian et al. (2013), which identified specific cultural orientations influencing OC in Iran. Trompenaars also highlights the importance of how different cultures interpret words differently, which can also impact on the outcomes, (Trompenaars and Hampden-Turner, 1997).

Research by Mann (2009) identifies how OC can influence lean philosophy in higher levels of an organisation in terms of cross-functional communication. Singh and Singh (2012) highlight how OC can help to foster continuous improvement with an organisation and the flow on effects this has within the company. Bortolotti, Danese and Romano (2013) provide research identifying some areas of OC that are specific enablers and inhibitors for continuous improvement, which include high collectiveness combined with lower assertiveness; however, it was also suggested that further research be conducted, as the same aspects of OC were found in no-lean plants, although it does help to reinforce the concept of OC as an enabler for specific performance and the need to focus on soft aspects of LC. The importance of continuous improvement in a LC is further solidified by Singh and Singh (2012), who suggest it also helps to instil greater confidence in employees and add to the organisation's competitive advantage. In summary, The soft lean aspects are considered critical factors for the success of lean implementation. (Bortolotti, et al., 2015) suggest that future research is needed into the specific role that each OC factors has in implementing lean management. This is in particular the case

because many of the same OC characteristics were discovered in high performing non-lean plants in their study. Thus they could not attribute these as being exclusively important to lean management (Bhasin and Burcher, 2006).

2.3 Section 3: The Saudi arabia context

As this study explores the organisational culture enablers and inhibitors of lean implementation in a Saudi setting, this section presents an overview of Saudi Arabia and its development, as a background to the study. The Kingdom of Saudi Arabia is the homeland of the Arab people, the birthplace of Islam. Saudi Arabia includes the two holiest places for Muslims in the world. These two places are Mecca, which is the prayer direction of all Muslims in the world, and Medina, which is known as the city of the Prophet Mohammed. The foundation of the Kingdom of Saudi Arabia was announced on the 23rd of September 1932 by King Abdul-Aziz Al-Saud, who made a great effort to unite the different states of the Arabian Peninsula so they would be under one flag (Al-Angari, 2004; Al-Turaiqi, 2008). Saudi Arabia is considered the world's leader in producing oil and natural gas, as it holds approximately 25% of the world's proven oil reserves (Ministry of Economy and Planning, 2015). However, Saudi Arabia is still considered a developing country. This section reviews the relevant literature on Saudi Arabia.

2.3.1 The Saudi Arabia context

The Kingdom of Saudi Arabia (KSA) is the second largest in terms of land size of the Arab states, second only to Algeria, and it occupies the main portion of the Arabian Peninsula. At its northern border are Iraq and Jordan, on the south is Yemen and Oman, at the northeast is Kuwait, with the east comprising Bahrain, Qatar and the UAE (United Arab Emirates). In the east is the Arabian Gulf, whilst the Red Sea is to the west (World Population Review, 2014). The Map of KSA shown in Figure 2-12 below illustrates the country's geographical location.



Figure2-12 The KSA map (source: Tang et al., 2018)

The total area of the KSA is 2,149,690 sq. km; the country comprises five major cities, namely Riyadh, Jeddah, Mecca, Medina and Ad Dammam, Riyadh being the country's capital. Arabic is the native language and Islam is the main religion. According to the United States Bureau of the Census, KSA ranks 47th in the world in population. The population in January 2018 was 31,345,986, and immigrants make up to 30% of the population (Saudi Arabia government, 2018).

2.3.2 Government Systems

The governmental system of Saudi Arabia is a monarchy, a centralised system in which the King has wide-reaching authority and has the three fundamental powers: legislative, executive, and judicial. The official title of the King is the Custodian of the Two Holy Mosques. There are two legislative bodies in Saudi Arabia: the Council of Ministers and Majles Al-Shura (Consultative Council). The President of the Council of Ministers is the King, who appoints all the ministers. The main role of the Council of Ministers is to be responsible for the management of internal and external affairs. Majles Al-Shura was established in

1992 as an advisory body to support the King. It has a limited role in the legislative system, as it has no authority to set legislation or enforce laws (Barrak, 2011). It is overseen by 60 members chosen by the King, and most of them have received higher education degrees from the best universities in the world. The laws in Saudi Arabia are issued by royal decrees.

As Saudi Arabia has never been colonised by any other country, it has developed its own society, culture, and economy, and the Islamic religion influences most aspects of life. In addition, because Saudi Arabia is an Islamic country, its legal system is influenced by Islamic rules, which are based on the *Holy Quran* (the book of Allah), *Sunnah* (the traditions of the Prophet Mohammed (PBUH)), and two other sources associated with Islamic Sharia Law, namely *Ijmaa* and *Qiyas*. Some Western influence is seen in the business area, however. Some Western countries have exerted an influence in terms of accounting practices in Saudi Arabia through the education of accounting professionals as well as capital market development (Alkhtani, 2010).

Furthermore, Saudi Arabia has a special position among the Islamic and Arab countries. According to the Saudi Arabia Monetary Agency (Saudi Arabia Monetary Agency, 2015), Saudi Arabia is a founder member of many international organisations, such as the Gulf Cooperation Council (GCC), the League of Arab States (LAS), the Congress of the Islamic World, the United Nations (UN), the International Monetary Fund (IMF), and the G20.

2.3.3 Saudi Arabia Culture

Abu-Musa (2008) pointed out that Saudi culture is 'unique [and] shaped by the influences of religion, tradition, tribal structure and distinct values and behaviours' (p. 7). As the religion of the majority, Islam acts as the main source for shaping people's norms, values, patterns, traditions, obligations and privileges (Abu-Musa, 2008). Similar to other Arab countries, affiliation to the family and the tribe are important in order to obtain support in everyday life (Al-Saggaf and Wagga, 2004). A family is created by a legal marriage between a man and a woman. Families normally consist of a mother, father, sons, daughters, grandfather, grandmother, uncles, aunts and cousins.

Unlike Western countries, women in the KSA have to abide by differences, such as the following: (1) In order to prevent illegal relationships and for modesty, Saudi women have to wear a veil called an Abaya when leaving home (Dutta, 1998); and (2) Working is voluntary for females as men are obligated to financially support their female dependents such as mothers, daughters and wives. Gender segregation is part of Saudi culture. The separation between male and female is observed in many professional places, such as schools, universities and bank branches. In places, such as hospital departments and shopping centres, males and females are allowed to work together.

2.3.4 Lean implementation in Saudi Arabia

The Middle East is realising the importance of lean culture in order to advance operations and practices in the oil and gas industries as value-adding and creating high standards in operations (Salem *et al.*, 2016). The business environment in KSA and the Gulf countries is somewhat more difficult in terms of implementing lean principles compared with other countries (Al-Najem *et al.*, 2012), because in KSA and the Middle Eastern countries, most industries are either directly or indirectly linked to the oil and gas industry. However, production advancements there should naturally trickle down into the non-oil and gas industries. It is this relationship in which lean thinking enablers can create opportunities for higher operational standards.

At the same time, the business environment involves a finely woven network of symbiotic relationships and synergies among the industries, which can in turn inhibit lean thinking and lean implementation (Chiarini, 2012). This is primarily because independent decisions cannot be made without senior management approval. Furthermore, very little literature on lean implementation has been done within the oil and gas sector and especially in the Gulf countries. Salem *et al.* (2015) aimed to assess aspects pertaining to lean implementation in the oil and gas industry. In his research he discovered that in the case of Qatar, which consists primarily of oil and gas companies, research showed that the majority of companies were not aware of the lean philosophy (Chiarini, 2012). However, it was identified that a greater awareness of lean principles existed among the

non-oil and gas sector (Salem et al. 2015). It was further highlighted that this awareness correlated more highly amongst ISO-certified companies, as a number of these certifications overlap with lean manufacturing principles (Salem et al. 2015). However, the issue identified is that this understanding among the manufacturing organisations in the Gulf countries is significantly embedded in other management systems such as ISO standards (ibid).

A failure to understand leanness as an isolated philosophy creates barriers. Organisational culture has been heavily researched, highlighting its importance in organisational performance (Al-Swidi and Mahmood, 2011). Further, it has been identified that different sub-regions of the world, the Middle East, Eastern Europe, Western Europe and Asian regions all are unique in terms of OC and national culture. Thus in order to achieve successful lean systems, each region needs to approach it in a feasible way, aligning itself with its own national and corporate cultural mechanisms (AL-Najem *et al.*, 2013)..

Not only has literature highlighted a lack of knowledge and difficulties in lean implementation in the Middle Eastern and Gulf countries but also an increasing concern for the need to implement a lean culture in SMEs, (Al-najem, 2014). One reason for the difficulties in implementing a LC is a lack of understanding of Toyota's corporate culture and how it facilitated the success of lean within the organisation (Achanga *et al.*, 2006). According to Xiao et al. (2013), SMEs are a vital part of a nation's economic prosperity and in some Middle Eastern countries, SMEs get little attention or support in comparison to the larger oil and gas companies. According to Al-Najem et al. (2013) research on implementing Lean in SMEs in Kuwait is non-existent.

As reported by Calabrò and Mussolino (2013), SMEs face different challenges in business and in internationalisation due to the nature of numerous informalities that permeate numerous areas of the business such as board member affiliations being heavily based on trust, informal governance mechanisms, and non-economic goals driven by the family in family-owned businesses. This informal nature has been attributed to impact on SME export intensity (Calabro and Mussolini, 2013). Calabro and Mussolini (2013) studied

lean implementation in SMEs in manufacturing in general and suggest a greater emphasis on in-house elements that are less financial are key to the success of lean implementation in SMEs.

In addition to this, Rose et al. (2010), suggest that SMEs should implement an LC gradually by starting with aspects that are the easiest to implement and the most cost effective. While the research by Rose et al. (2010) is particularly useful to this study, its focus is on LC; best practices for SMEs and OC aspects are not addressed. According to MENA (2004), Arabic countries have their own specific attributes and the majority of companies are SMEs with an organisational culture that strongly reflects their nature as a 'family' business. MENA (2004) highlights the need for universalising business principles and the responsibilities of boards of directors and governance if Arab SMEs are to be able to internationalise. According to Ahmed et al. (1999), Arab organisations can benefit significantly by implementing quality initiatives to address their weaknesses and make them more competitive on an international scale. However, there is a real gap in research pertaining to the influence of OC in lean implementation amongst SMEs in Arabic countries and the KSA in particular.

2.3.5 Summary

This section described the Saudi Arabian context, exploring the current status of lean implementation in Saudi Arabia. This section offered a brief background on Saudi Arabia and its developments and environment, as it forms the context of the study. Compared to other countries, Saudi Arabia has a short history. However, after oil was discovered, its economy developed quickly and switched from agriculture, making Saudi Arabia a powerful country in the Middle East. In addition, lean implementation has encountered major difficulties in the SME manufacturing sector in KSA and effected by many factors. However, organisational culture or lean culture is one of the most important factor to focus on regarding lean implementation to be successfully implemented.

2.4 Conclusion

Studies have shown that many researchers are in agreement that an OC which does not support lean principles is a large reason for the failure of successful lean implementation, (Munene, 1995; MacDuffie and Helper, 1997; Dixon, 1999; Brown, Willis and Prussia, 2000; Womack, J., & Jones, 2003; Schonberger, 2007). Studies conducted on lean implementation among SMEs have tended to be concentrated in the EU, Asia, USA and Canada, Australia and New Zealand and Africa. However, very little of this has been applied to the Arabic countries and in particular Saudi Arabia and none discuss lean implementation in SMEs in conjunction with OC (Wanitwattanakosol and Sopadang, 2012). The gap highlighted in the research is the role of OC in facilitating the benefits to be derived from lean systems. With regards to OC, very little is discussed about how some national cultures and in this instance, how the Saudi Arabian national culture can either help to enable or impede the facilitation of a LC within SMEs (Bhasin and Burcher, 2006; Zhou, 2012a; Brannen, 2015). Culture can influence how an organisation is defined, either as a group of people who have social interactions with each other or as a system where each party has a role to play to achieve organisational goals (Trompenaars and Hampden-Turner, 1997). The way management and employees define and view the organisation will impact the OC.

This aspect highlights the gap this research will aim to uncover; how OC can be used to leverage lean implementation in SMEs in KSA (Alkhorair and Mclaughlin, 2017). This is necessary to keep in mind when transforming into LC. It has also been identified that the failure rate of lean implementation in SMEs tends to be higher compared with larger enterprises (Prajogo and McDermott, 2011). This has also been attributed to the tendency of SMEs to only implement certain lean tools as apposed an entire lean philosophy. A lack of knowledge regarding how lean principles should be implemented when not at a 'task level' permeates the literature (Cameron, 1994). Furthermore, numerous social aspects have been identified with the success of lean implementation in organisations. These social factors permeate from the upper levels of the organisation down to the task levels, (Pakdil and Leonard, 2015a).

Factors such as fairness, leadership commitment to lean implementation, employee commitment, knowledge sharing and continuous improvement have all been identified as enablers of an LC in an organisation (Angeleis et al, 2010). The research has revealed some disagreement as to the ease and ability for SMEs to successfully implement a lean philosophy. This is further reinforced by the continuous improvement philosophy, which demonstrates numerous overlaps with lean concepts and has been the key strategy in Japanese manufacturing due to its high effectiveness and lower cost implementation and is highly suitable for SMEs (Yan-jiang, et al., 2006). Finally, with regards to LC, there is a general understanding of factors which should exist in a LC. These include the adoption of communication horizontally and vertically throughout the organisation, an environment which encourages a high level of employee involvement in decision making and improvement projects, attitudes among all staff that are open and always proactive to find better ways of doing things, and a leadership style which encourages and supports such behaviours (Shingo, 1988; Mann, 2009).

Key to the LC is having an attitude which emphasises a customer driven value system (Womack, J., & Jones, 2003; Yasin, Small and Wafa, 2003; Al-najem, 2014). This does not prioritise any individual department but emphasises the end result and how departments can put aside their own internal boundaries to co-operate more effectively, achieving greater customer value (Al-Najem et al., 2012). The literature gives guidance on how this can be implemented in larger organisations with bigger hierarchies, but the gap that still exists is a framework that pieces together the important elements of LC and presents this in a way that is applicable to SMEs in Saudi Arabia (Alkhoraif and McLaughlin, 2018b, 2018c). Finally, the finding outlined in the chapter suggest there are a number of research gaps as follows:

- Lack of research on lean implementation for SMEs
- Lack of research focused on SMEs manufacturing sector.
- Focusing on soft issue is needed for lean implementation.

- Most of the research didn't take the importance of organisational culture into account, focusing instead on operations and not considering any of the cultural issues and factors that need to be managed simultaneously.
- Lack of research regarding the critical factor of organisational culture related to lean implementation
- Lack of Lean research has focused on the Middle east region.
- Lack of knowledge as well as difficulties in lean implementation in Middle Eastern and Gulf countries, but also increasing concern about the need for lean implementation in SMEs.
- There was no research focused on lean implementation within SMEs in manufacturing sector in Saudi Arabia.
- There was no research focused on lean implementation be leveraging aspects of organisational culture within SMEs in manufacturing sector in Saudi Arabia
- There was very little research carried out that used grounded theory and action research in terms of lean implementation.

This study addresses research gaps by developing a framework to improve lean implementation for SMEs manufacturing sector in Saudi Arabia by leveraging aspects of organisational culture.

3 Chapter 3: Methodology

3.1 Introduction

Developing a framework addressing the need for an OC to better facilitate a lean culture and propel its success among SMEs in the KSA requires a methodology that supports the research and analysis of OCs in regard to lean implementation. Therefore, for the purposes of this research it is crucial to incorporate suitable research methods that address OCs and its issues. The way in which the methodology was implemented is discussed and analysed in the following sections, evaluating the pros and cons of methodological options such as case study, phenomenology, grounded theory, laddering, action research, cognitive mapping and ethnography. In addition, this chapter provides an overview of research strategies, data collection, data analysis, validation and research process.

3.2 Organizational Culture and Research Issues

Organisational culture is a social science that has been discussed and brought up in many business disciplines. Yet, there is a lack of empirical research that adequately uncovers the integral nature of OC and its impact on organisations and their functioning (Pearse and Kanyangale, 2009). This is partly the result of the existence of abstract concepts in OC making it more complicated to research, (Sackmann, 1991). However, the following will attempt at proposing an appropriate research methodology suitable for researching OC.

In part the problem exists in adequately defining culture and that in a number of cases, many of the fundamental aspects of culture which include beliefs, customs, value systems, behavioural norms and tangible or visible artefacts can be easily missed in research methods or over-simplified (Pearse and Kanyangale, 2009). Schein (1984) suggests that a number of methods utilised by those analysing OC take the approach of merely asking the correct questions. The other alternative might be to adopt a structured questionnaire, although the limitation with this is that it needs a strong understanding of the cultural context in which the OC is set (Sackman, 1991). This is usually not the

case when approaching this kind of research (Bryant, 2009). Therefore, the issue of very thinly distributed empirical knowledge and research on OC and its context leads towards the use of a more inductive research approach (Golden-Biddle and Locke, 2007). This is because an inductive approach is better able to facilitate the establishment of a theory of culture within an organisational context, although, it can be difficult making comparisons between organisations with this approach (Sackmann, 1991).

Among the many different definitions of culture, it can be defined as '*... a set of assumptions commonly held by a group of people. The set is distinctive to the group. The assumptions serve as guides to acceptable perceptions, thought, feeling and behaviour, are tacit among members, are learned and are passed on to each new member of the group*' (Phillips, 1994, p. 6). With this definition in mind, it requires revealing assumptions or beliefs, which serve as the premise behind how people perceive things, think, feel and behave (Golden-Biddle and Locke, 2007). Artefacts and behaviours tend to be more surface level and not necessarily reflective of the underlying cognitive components (Birkinshaw et al., 2011). One way to consider culture is like an iceberg (see Figure 3-1), with artefacts, behaviours and espoused assumptions at the tip, and below the surface lies the tacit, commonly held, habitually used and emotionally anchored component which are structure of cultural realities (Birkinshaw et al., 2011). Gaining an understanding of these is critical in order to work out the visible aspects but to draw these out requires special techniques (Allard and Anderson, 2005). The following section will highlight the methods best suitable to help reveal these deeper, structural components of a culture.

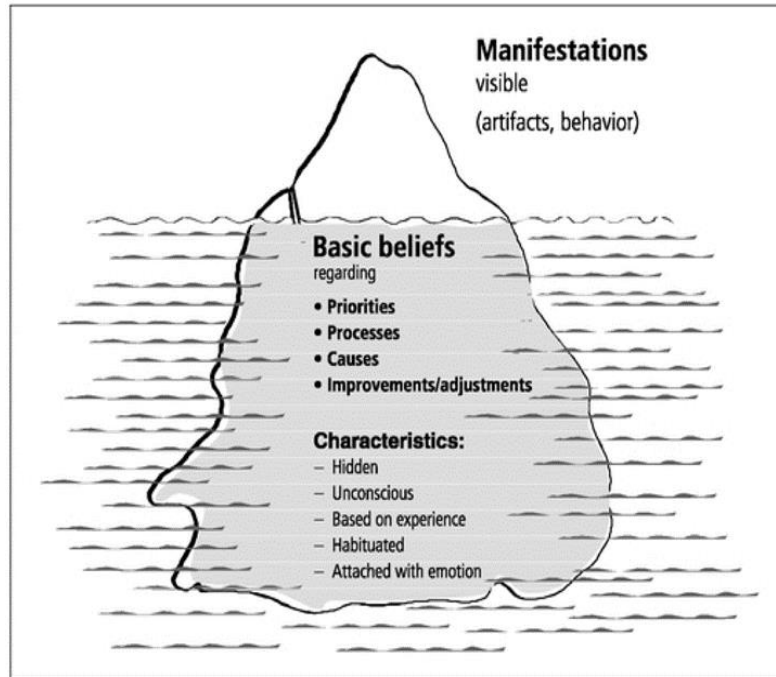


Figure 3-1 The Cultural iceberg model. Adopted from (Sackmann, 2006)

3.3 Conceptual framework

A useful framework to understand lean culture in terms of organisational culture is Schein's model (1984). Schein (1984) modelled the existence of 'artefacts, values and beliefs and the behaviours which are commonly shared and accepted by members in the organisation' (Detert et al., 2000, p. 851). Schein's model suggests that organisational culture is established from a group working together and developing patterns as they collaborate to solve problems and ensure organisational survival (McLaughlin, Bessant and Smart, 2010). His model is comprised of three levels. The first level is artefacts which are the objects and elements which can be seen or experienced such as the company building and logos, the processes, communication, etc. The second level is espoused values that are comprised of the principles and standards within an organisation belonging to their employees; these describe what is considered important by the organisation. Finally, the third level is underlying assumptions, which refers to beliefs, thoughts and feelings. Schein's model emphasises the way in which artefacts and values can expose things regarding underlying assumptions, (E. H. Schein, 1990a).

Schein's models have proved to be powerful in understanding and measuring organisational culture. Schien's model helps in understanding OCs at different levels such as artefact, espoused values and basic underlying assumptions by fully describing the organisational behaviours as norms and relationships between group members. It is found to be more about observing than collecting data. An organisation could be judged by observation of people and their dress code(Alkhoraif and Mclaughlin, 2017). Schein's model is shown in Figure 3-2.

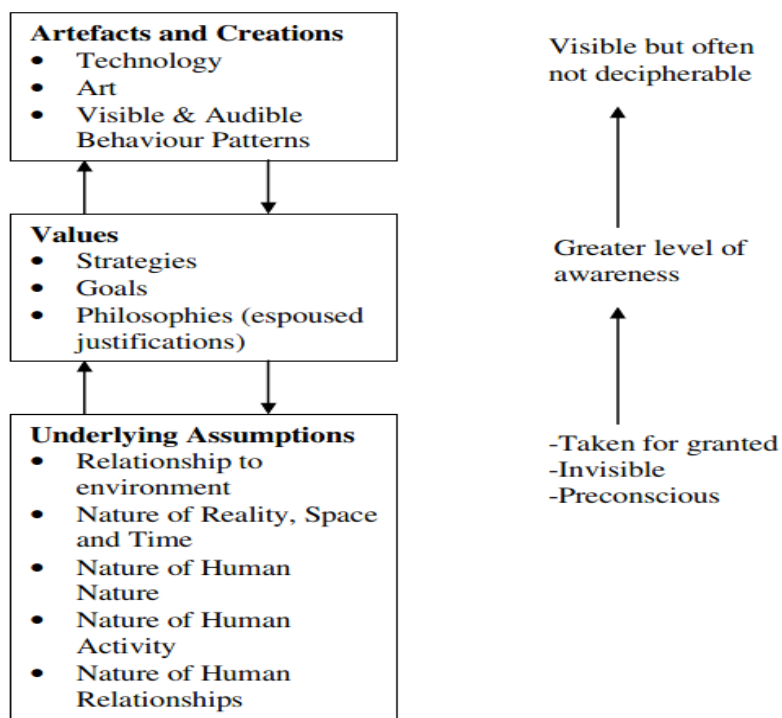


Figure 3-2 Schein's model of organizational culture

3.4 Research philosophy

It is essential to select an appropriate research paradigm that reflects the nature and characteristics of the area of study (Strauss, 1987). According to Strauss (1993), *'This is a universe where nothing is strictly determined. Its phenomena should be partly determinable via naturalistic analysis, including the phenomenon of men [and women] participating in the construction of the structures which shape their lives'* (Strauss, 1993, p. 19). Thus, it would make sense to consider the type of methodological philosophy that encompasses the complexity and ambiguity of inbuilt events and behaviour as described in

Strauss's quote above. It suggests that what essentially is considered 'done procedure' and works today is quite likely to be problematic in the future (Guba and Lincoln, 1989). This necessitates a theory that helps to answer the questions of today but takes into account that these may likely turn back into questions in the future (Guba and Lincoln, 1989). Table 14 provides descriptions of paradigms which tend to compete for selection in guiding an inquiry in qualitative research.

Table 3-1 Methodological Philosophical Options

(Source: Guba and Lincoln, 1989).

	Positivism	Post positivism	Constructivism
Ontology	'naive realism 'real" reality but apprehendable'	'critical realism – 'real' reality but only imperfectly and probabilistically apprehendable'	'relativism, local and specific constructed realities'
Epistemology	'dualist / objectivist findings are true'	'modified dualist; objectivist critical traditional / community findings probably true'	'Interpretivist'
Methodology	'experimental / manipulative verification of hypotheses; chiefly quantitative methods'	'modified experimental / manipulative critical multiples; falsification of hypotheses may include qualitative methods'	'hermeneutical / dialectical'

Ontology – naïve realism (Table 3-1, column 1) is propelled by unchanging natural laws. Knowledge of the way things are is comprised over time and can sometimes show up in cause and effect laws (Hesse, 1980). *Epistemology – dualist and objectivist* operate as independent units, and the researcher is able to study the object without influencing it or being influenced by it (Guba and Lincoln, 1994). *Methodology – experimental and manipulative* involves stating questions or hypotheses and go under empirical testing (ibid.).

Ontology – critical realism (column 2) is considered critical because its claims about reality is heavily scrutinised to facilitate the reality as closely as possible (Guba and Lincoln, 1994). *Methodology – modified experimental* emphasises triangulation as a way of falsifying hypotheses (ibid.). It aims to address some weaknesses such as those discussed above by facilitating an insider view to help identify the context and purpose surrounding the actions. These are mainly achieved through a greater use of qualitative techniques (Hesse, 1980).

For the purpose of this study, the constructivist approach has been selected. *Ontology – Constructivist* (column 3) takes into account non-physical, mental constructions that are socially and experimentally based, which might be local and specific in nature. Constructions can be altered because they are linked to realities (Guba and Lincoln, 1994). *Epistemology – interpretative* considers the researcher and the object are interactively linked, which means the results are created as the research proceeds, (Wright, 2004). In this case, the distinction between ontology and epistemology is eliminated. *Methodology – Hermeneutical and dialectical* suggests that individual's construction can only be drawn out by interaction between the researcher and the object (Guba and Lincoln, 1994). The aim is to identify a consensus construction which is more informed than the earlier construction. The red square in Figure 3-3 indicates the selection of the research approach.

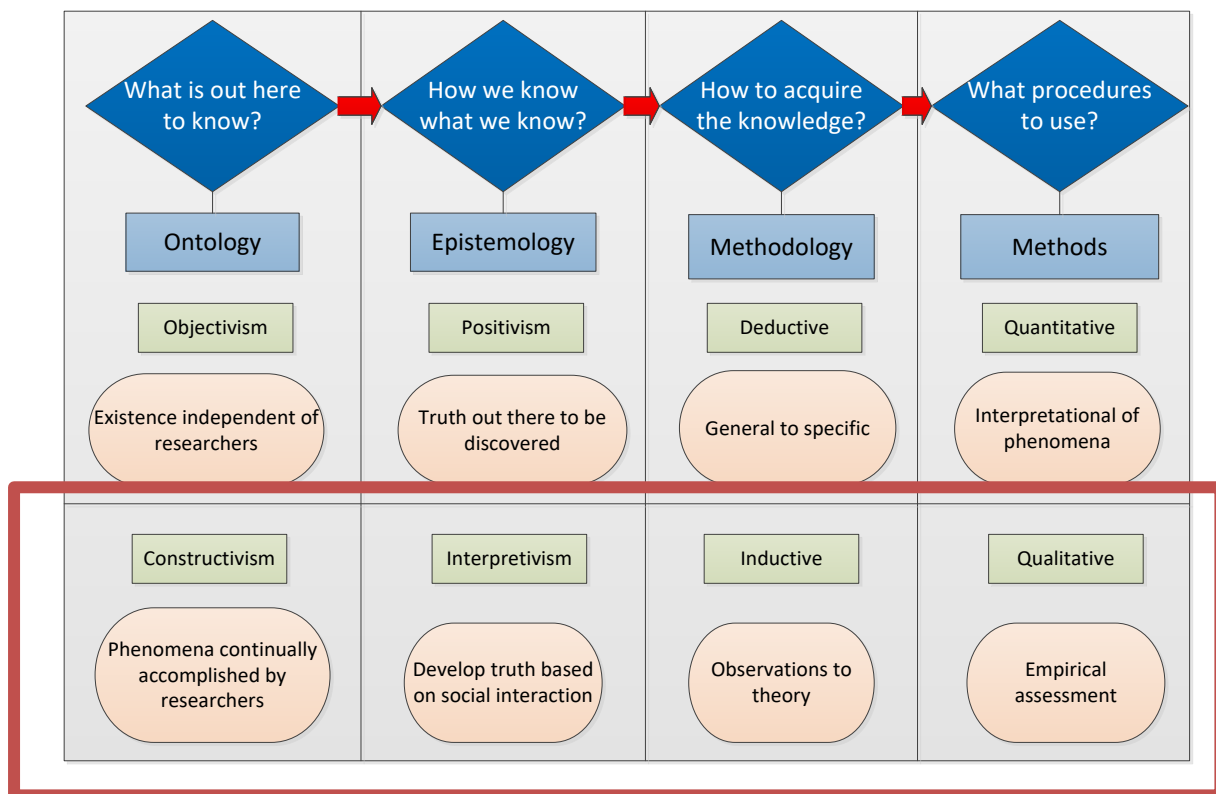


Figure 3-3 philosophical methodological process for current research (source: by author)

3.4.1 Ontology

Ontology refers to the ‘nature of reality and its characteristics’ (Creswell, 2013, p. 20). It poses the questions relating to the form and nature of reality and what can be discovered about it (Guba and Lincoln, 1994). Researchers tend to show their ontological options along a continuum with the polar opposites being positivism and constructionism and the middle being realism (Blaikie, 2009). Where a positivist view was taken it considered that an ‘*external reality existed, which could be discovered and totally understood,*’ (Howell, 2012, p. 4). Thus, is it also referred to as ‘naive realism’.

Under a post-positivism view, reality is believed to be understood imperfectly and thus emphasises a more critical evaluation of the existing reality (Howell, 2012). Thus, the notion is that reality is moulded by ‘social, political, cultural, economic and ethnic and gender values’, which are formed over time (Guba and Lincoln, 1994). Easterby-Smith et al. (2012) suggests the main

characteristic of positivism is where the observer is independent from what is being studied and forms the choice of what to study. Thus the choices are made by an objective criterion as opposed to human beliefs and decisions (Easterby-Smith et al., 2002). The positivist position aims to find casual explanations and by testing hypotheses. Due to this in order for concepts to be measured they need to be simplified.

There are two main strands of realism in social sciences; one is transcendental and critical realism and the other is constructivist realism. According to Howell (2012) critical realism takes into account '*a distinction between the knowledge of human being, which can change and knowledge that is of things...which is discovered*' (p. 51). Realism sits between the pure positivist and constructionist views of reality (Marcos-Cuevas, 2006). According to realists, social sciences should adopt the anti-positivist position, suggesting there are distinct differences between natural and social phenomena (ibid.). Realists tend to accept an interpretative view that society is produced and re-produced by the members within it, thus '*are both a condition and an outcome their reality*' (Blaikie, 2009, p. 59). Realism is more concerned with distinguishing between 'causal laws' and 'patterns of events' (Marcos-Cuevas, 2006).

Tsang and Kwan (1999) provide a summary of the three aspects of realism. First, it is focused on the structures and mechanisms as opposed to empirical events. Second, '*The structures and mechanisms are only contingently related to observable empirical events*' (p. 762). Third, it is always possible to generate knowledge via creative construction and critical testing of theories. Thus, in a constructivist approach, reality is created by both the researcher and the research participants (Ibrahim, 2013). This, according to Howell (2012), is founded on the phenomenological positions because this approach considers reality to be integrated with the integrations between subjective and objective perspectives. In relation to qualitative research the ontological perspective is constructivist, implying that the social factors are the result of interactions between peoples as opposed to a phenomena and it is separate from those constructing it, (Bryman and Bell, 2015).

3.4.2 Epistemology

According to Guba and Lincoln (1994), epistemology can be defined as '*the relationship between the knower or the would-be knower and what can be known*' (p. 108), thus, explaining the relationship between the researcher and the people being researched and relating this to how one comes to know what they know (Creswell, 2013). The epistemological perspective is interpretative, as it emphasises exploring the social world by analysing how the world is interpreted by the actors within it. Those taking a positivist view, the researcher is objective and his findings are considered what is true. The post-positivist view considers that findings which can be replicated are most likely to be true (Guba and Lincoln, 1994). In the constructive approach it considers the findings to be created and developed as the research progresses (Ibrahim, 2013).

Each of these philosophical positions for inquiry share a common element among them which is 'human construction' (Guba and Lincoln, 1994). They each provide their own specific approaches demonstrating how they work together within a situational research project. This can be seen in the way the post-positivism perspective emphasises cause and effect, while the latter mentioned paradigms place greater emphasis on understanding the world in which a phenomenology occurs (Ibrahim, 2013).

3.4.3 Constructivist Method of Inquiry

Any of the aforementioned approaches for inquiry could be selected for this research project in order to explore the phenomena occurring within the OCs under investigation. However, the real impact would become evident in the final results. Recently the constructivist approach has gained more credence among social-science methodologists (Ibrahim, 2013). However, the constructivist view takes the assumption that what is considered to be objective knowledge and truth ultimately results from the researcher's perspective (Schwandt, 1998). Moreover, it emphasises the phenomena of the research and considers both the data and its analysis as a combined result from the researcher and those researched, stemming from shared experiences and relationships (Charmaz, 2011). In light of the research objectives and the issues associated with

uncovering culture it appears the constructivist paradigm was the most suitable in fulfilling the aims of this research, due to its focus on shared experiences and its interpretation of reality as being locally constructed (Howell, 2012).

3.5 Research approach

Two main research approaches used by researchers are inductive and deductive (see Figures 3-4 & 3-5). This is heavily linked to the philosophical assumptions of the researcher (Saunders et al., 2009). The deductive approach tends to sit with the positivist paradigm, while the inductive tends to be utilised more as an option for interpretive research (Creswell, 2009). The deductive approach is advantageous for establishing causal relationships (Fisher, 2007). It particularly involves testing a theoretical position by utilising a research strategy for this purpose (Saunders et al., 2009). In a deductive approach the researcher is independent of the phenomenon being studied (Ibrahim, 2013). Criticisms of this approach have been that it does not fit with a number of theoretical models and due to its tendency to require a strict methodology it does not allow freedom for alternative explanations (ibid.).

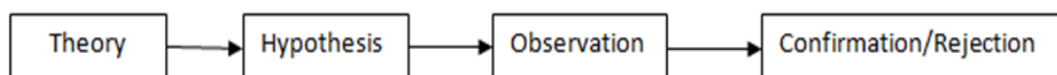


Figure 3-4 Deductive approach

This is particularly important in studies in the field of business and management or where human behaviour is a primary element (Ibrahim, 2013). The inductive approach however, is rooted in qualitative research (Saunders et al., 2009). In this approach, greater emphasis is given to individual interpretations and the experiences of the research participants. The inductive approach focuses on the relationship between theory and research, where the theory is generated from the research (Bryman and Bell, 2015). The inductive approach tends to be more flexible than the deductive approach, as it better facilitates for the researcher to make more informed decisions as to the research design and its

strategies while taking into account limitations, (Easterby-Smith et al., 2012). For these reasons the inductive approach was selected for this research.



Figure 3-5 Inductive approach

3.6 Research Design

In the past, quantitative research has been labelled as ‘hard’ while social sciences have been considered ‘soft’ and associated with less precision and dependability (Miles and Huberman, 1994a). However, criticisms of merely quantitative methods have emerged, which include: stripping variables of their context, excluding meaning and purpose, disjunction of outsider and insider approaches to study and inapplicability of general findings to individual cases (Miles and Huberman, 1994). These weaknesses of quantitative research can be significantly mitigated by utilising qualitative research. Furthermore, an important aspect of this is to ensure the researcher does not influence the phenomena, which is also a disadvantage of quantitative research (Miles and Huberman, 1994). This is particularly the case where an outsider approach can have very little meaning within the single view of researched groups or cultures. Qualitative research is confirmed to be useful for uncovering such insider views (Corbin and Strauss, 1990). Although qualitative approaches are also not without criticism, it is important to consider the paradigms and their underlying assumptions.

In this research study the aim is to explore OCs and how they can influence the success or failure of lean philosophy in SMEs in the Saudi Arabian manufacturing industry. This topic has not previously been heavily researched. Thus, in line with Creswell’s definition below, a qualitative approach has been selected. According to Creswell (2013), in qualitative studies much exploration needs to be done into the research problem as the variables are rather unknown and the general aim is to research the context that might shape the

understanding of the phenomenon that is under investigation. According to Denzin and Lincoln (2011), it is important for qualitative researchers to conduct their research within their natural setting in order to interpret the phenomena in accordance with the meanings the research participants attribute to things (Javadi, 2013). Qualitative research tends to involve the use of a number of empirical materials such as observations, interview, focus groups and life stories (ibid.).

Creswell (2007) defines qualitative research as ‘*an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem*’ (p. 15). This research puts together a complex but holistic image of analysis through words, and detailed accounts from participants within their natural setting (Creswell, 2007). Many researchers have made distinctions between qualitative and quantitative research as a result of their characteristics (Javadi, 2013). The most significant quantitative and qualitative characteristics are outlined in Table 3-2.

Table 3-2 Characteristics of Qualitative and Quantitative Research

(Source: Javadi, 2013)

No.	Criteria	Qualitative Research	Quantitative Research
1.	Purpose	To discover and interpret meaning and perceptions of social interactions.	To test hypotheses developed before research begins, look at cause and effects, and make predictions
2.	Focus	Wide-angle lens, examines the breadth and depth or phenomena.	Narrow-angle lens, tests specific hypotheses.
3.	Group Studied	Particular to the subject group. Smaller and not randomly selected. Replication is rare.	Larger and randomly selected. replication across different sites is possible.
4.	Variables	Study of the whole, not variables.	Specific variables studied.
5.	Data Type	Words, images or objects.	Numbers and statistics.
6.	Data Collection Method	Qualitative data such as open - ended responses, interviews, participant observations, field notes, and reflections.	Quantitative data based on precise measurements using structured and validated data collection instruments.
7.	Data Analysis Type	Identify patterns features, themes.	Identify statistical relationships
8.	Research Scope	Particular to the subject group. Replication is rare	Standardised so that replication across different sites is possible

No.	Criteria	Qualitative Research	Quantitative Research
9.	Units of Analysis	Subjects are selected to fit the purpose of the study.	Subjects are selected randomly.
10.	Objectivity and Subjectivity	Subjectivity is expected.	Objectivity is critical.
11.	Role of Researcher	Researcher and their biases may be known to participants in the study, and participant characteristics may be known to the researcher.	Researcher and their biases are not known to participants in the study and participant characteristics are deliberately hidden from the researcher.
12.	Question	Are typically open ended allowing flexibility in response.	Asked in such a way that the answers are a fixed set of choices.
13.	Scientific Method	Exploratory or bottom - up: the researcher generates a new hypothesis and theory from the data collected.	Confirmatory or top - down the researcher tests the hypothesis and theory with the data
14.	View on Human Behaviour	Dynamic situational, social and personal.	Regular and predictable.
15.	Most Common Research Objectives	Explore discover and construct	Describe, explain and predict.
16.	Contact with the Subject	Research takes place in the field and involves face to face encounters with the subject.	Research can't take place without direct contact with subject, as in the case of telephone or mailed surveys.
17.	Nature of Observation	Study behaviour in a natural environment.	Study behaviour under controlled conditions; isolate causal effects.
18.	Nature of Reality	Multiple realities; subjective.	Single reality; objective.
19.	Final Report	Narrative report with contextual description and direct quotations from research participants.	Statistical report with correlations, comparisons of means, and statistical significance of findings.
20.	Results	Particular or specialised findings that is less generalisable.	Generalisable findings that can be applied to other populations.
21.	Role of Theory in Research	Inductive, generating theory.	Deductive, testing of theory.
22.	Ontological Orientation	Constructionism	Objectivism.
23.	Epistemological Orientation	Interpretivism.	Natural science model.

Qualitative research utilises a more descriptive method for gathering and interpreting information in order to understand the broader phenomenon (Javadi, 2013). There are numerous advantages to utilising a qualitative approach, in that it gives far more depth in terms of understanding the phenomenon. It helps to find answers to questions by studying a number of social situations and the individuals within that environment (Bruce and Berg, 2001). There is however, another perspective on qualitative research. Babbie (2015) suggests it is a suitable strategy for researching subtle nuances in the

attitudes of people and their behaviours for the purpose of understanding the development of social processes over a longer period of time. Furthermore, more flexibility and greater validity are other associated advantages of qualitative research (Babbie, 2015). It also provides the researcher with a greater level of flexibility to identify numerous variables across a number of OC environments (Javadi, 2013). According to Audet (2001) when the main objective is to improve knowledge about a phenomenon, qualitative research methods are normally favoured. Here, this research involves the study of OC and depends heavily on qualitative techniques as opposed to quantitative in order to understand the phenomenon.

3.7 Research Methodologies

There are a number of strategies available to researchers to conduct their research. As the aim of this study is to build a theory and a framework as opposed to testing a theory, the choice of methodology most appropriate for this is the Grounded theory of Glaser and Strauss (1998). An action research approach was adopted to determine the factors that affect lean implementation processes. As stated by Weber (2004), the main aim of research is to improve knowledge about particular phenomena. Moreover, there are many research strategies and methodologies mentioned in literature. In the following sections, the different research methodologies will be outlined.

3.7.1 Case Study

An important aspect to consider is why the choice of grounded theory and not the 'case study' as a research methodology. If a case study were selected, then only one manufacturing company (SME) in Saudi Arabia would be researched. However, by selecting grounded theory it opens the scope to including more manufacturing SMEs in Saudi Arabia into the research sample (Javadi, 2013). Table 3-3 depicts the characteristics and contrasts between case study and grounded theory approaches. .

Table 3-3 Characteristic of Case Study and Grounded Theory

(Source: Leedy, (1997), Table 7.2, p 166).

NO	QUESTION	CASE STUDY	GROUNDED THEORY
1	What is the purpose of the research?	To examine a single 'case' in depth in order to understand the person or phenomenon	To drive a theory that links participants' perspectives to general social science theories
2	What is the nature of the research process?	Studies on bounded cases, Focus on natural context	Studies 'process' Focus on interactions
3	What are the methods of data collection?	Interactive fieldwork, Formal and informal interviews, Some use of quantitative measures.	Draws from historical records interviews, observations, Variable, multiple units
4	What are the methods of data analysis?	Interpretational search for themes, Structural search for patterns in discourse, Reflective rich portrayal of participants views	concept oriented open axial and selective coding constant comparative method
5	How are the findings communicated?	Analytical (objective) narrative, reflective (literary) narrative	Analytical story

One aspect which is important to note is that grounded theory can be utilised in conjunction with a case study (Javadi, 2013). It could be utilised as a mode of inquiry and unit of analysis for the case study. Table 6 also identifies some overlap between the characteristics; however, a case study approach would limit the research to one single organisation.

3.7.2 Ethnography

Ethnographic research in a methodological sense refers to studying the manner in which people interact (Gill and Johnson, 2010). In addition, it aims to study people's behaviour and their culture (Oates, 2009). This methodology offers insights about a group of people and provides the chance to observe and understand their environment (Boyle, 1994). In this mode of inquiry the researcher immerses themselves in the social setting for a longer span of time observing the behaviour and conversations between individuals and at times,

asking questions (Fisher, 2007). Current research methods utilised to study culture include in-depth ethnographies at one end of the spectrum and at the other, pragmatic questionnaires (Cameron and Freeman, 1991). Both of these methods suggest studying culture, yet what they tend to discover is rather different (Allard and Anderson, 2005). The advantages however, of utilising a detailed ethnography method is that it does tend to provide in-depth information specific to the context, which can be useful in identifying paradoxes or any inconsistencies (Allard and Anderson, 2005).

However, the main disadvantage associated with ethnographic research is it requires a high level of participation from the researcher for the full extent of the data collection. The researcher is required to be a full-time group member as well as a researcher. In addition, the researcher needs to spend more time in the field in order to understand the culture under study (Oates, 2009; Collis and Hussey, 2013; Merriam and Tisdell, 2015). In addition, the reflexive nature of ethnographic research is a characteristic that implies that the researcher is part of the world under study and consequently affected by it (Boyle, 1994; Goulding, 2005). Also, it is difficult to gain access for long periods in the field (Punch, 2005; Bryman, 2008). In addition, the disadvantages to utilising this method is that it is generally extremely time consuming and the nature of the information does not easily enable comparisons to be made between cultures (Birkinshaw et al., 2011) Moreover, it does not facilitate making generalisations beyond the context the situation was researched in (Cunliffe, 2010), thus, rendering it an unsuitable approach for creating a framework.

3.7.3 Cognitive mapping

Cognitive mapping (also known as mental mapping) is a method that can be used to explore a person's beliefs about a particular topic as well as relationships that exist among the beliefs (Kenney, 2009). Cognitive mapping 'is a process composed of a series of psychological transformations by which an individual acquires, stores, recalls, and decodes information about the relative locations and attributes of the phenomena in his everyday spatial environment'

(Downs and Stea, 2011). Eden and Ackermann (2009) define a cognitive map as

A model designed to represent the way in which a person defines an issue. It is not a general model of someone's thinking, neither is it intended to be a simulation model of decision making. It is a network of ideas linked by arrows. The arrows indicate the way in which one idea may lead to, or have implications for, another.

The disadvantages of cognitive mapping are the interviewer's ignorance, knowledge, misconceptions and biases are all encoded in the map (Kosko, 1992); it cannot deal with co-occurrence of multiple causes such as expressed by 'and' conditions, and 'if-then' cannot be coded as well (Schneider *et al.*, 1998).

3.7.4 Action research

Action research is a strategy that allows practitioners to examine and improve their own working practices (Baskerville and Wood-Harper, 1996; Oates, 2009). It is intended to solve existing problems in the professional environment (Collis and Hussey, 2013). Collaboration is needed between the researcher and members of the field of work under investigation in order to identify the problem and provide the solution (Bryman, 2012). Action research tends to be used for prompting conscious change within a somewhat controlled environment (Collis and Hussey, 2013). In this approach, the participants and the researcher collaborate on a problem to find a solution, (Coghlan and Brannick, 2014). This is an inquiry mode generally utilised to help solve organisational issues by dealing with those experiencing the problems (Ibrahim, 2013). Some main weaknesses associated with action research is the assumption that the behaviour of a person is only able to be changed by testing them, and moreover, it tends to require set timelines and is usually expensive to conduct over the full research period (Fisher, 2007). The researcher in this approach is concerned with performing actions, not only describing or observing. Therefore, it is 'research into action' – planning for change, performing the change, reflecting on what happened then starting another cycle (Oates, 2009, p. 155). It

aims to investigate and bring change to phenomenon (Punch, 2005, p. 160). This approach requires the researcher to work in the field of study and involves a continuous cycle of improvement (Partington, 2002). Alderfer and Smith (1982) stated that when action research is part of the contract between researcher and organisation then the microcosm group also plays a key role in the design and conduct of data feedback.

3.7.5 Phenomenology

Phenomenology is a qualitative research method propounded by Husserl (1970) that studies people's experiences (Merriam, (Merriam and Tisdell, 2015). It fits small-scale research best and gives descriptions reflecting the complexity of the social world (Denscombe, 2010). It has a 'focus on the experience itself' and is concerned about the experiences of our lives (Merriam, 2009, p. 24). However, participants in this study may lack the required experience, which may prevent the researcher from gathering the required data. Also, in phenomenology studies, the words of information are considered the one valid source of data (Goulding, 1998). However, in this research multiple data sources, which include interviews, observation and published reports were gathered and applied.

3.7.6 Grounded theory

Grounded theory is a research methodology that aims to create a theory from data that have been systematically researched and analysed (Javadi, 2013). This methodology was originally used by (Glaser and Strauss, 1967), undertaking an observational field study with patients who were soon facing death. They defined grounded theory as '*the discovery of theory from data*' (Glaser and Strauss, 1967, pg. 1). According to (Golden-Biddle and Locke, 2007), grounded theory has been the most often utilised qualitative methodology in social science research. Its popularity can be attributed to: first, its suitability for developing new theory or new insights from old theory; second, it generates theory which stems from what the research participants consider important; finally, it is able to expose micro-management processes in complex situations and environments (Locke, 2001). Goulding (1998) suggests grounded

theory is particularly useful for making new discoveries, thus its usefulness for theory generation. Furthermore, Locke (2001) and Goulding (2005) also consider grounded theory as useful where there is a clear lack of integrated theory in an area of literature.

According to Stern (1980), '*grounded theory becomes an answer where other methodologies did not work well enough, especially in the sensitive dependant variable fields within the health science and business and management*' (Stern, 1980, p. 30). Goulding (1988) suggests that grounded theory becomes particularly useful when a subject matter has been rather ignored or dealt with superficially. Corbin and Strauss (2014) also provide an example of when and when not to use grounded theory. They suggested that if one wants to know if a drug trial is more effective than another, in that case it would be more useful to use a double-blind clinical trial as opposed to grounded theory. However, if one wanted to know what it is like to participate in a drug study, then grounded theory or some other form of qualitative research approach would be most suitable. Thus, it is particularly useful for theory generation from social processes and actions which have been through situations from people who have experience in the phenomenon being studied (Goulding, 1998).

The main feature of this approach is to develop categories that highlight the data and develop the categories to create a framework (Silverman, 2006). This approach has been most commonly utilised for qualitative research in social sciences since its inception (Altheide and Johnson, 1994). Grounded theory tends to be inductive, as it seeks out the interpretations and perspectives of those in the situation under research (Charmaz, 2011). A differentiating factor of grounded research from the other inquiry modes is in its investigation into the questions of 'why' and 'how' in a way that is grounded in the data rather than deduced logically (Jones, 2009). Another great advantage to grounded theory is that it allows the researcher more flexibility and to utilise interviews as a data collection tool (Glaser and Strauss, 1967). The theory is discussed in more detail below.

3.7.7 Laddering: making sense of meaning

Laddering is a technique used in qualitative research to understand behaviour in the context of marketing; it has been used to explore consumer attitudes, opinions and beliefs (Modesto Veludo-de-Oliveira et al., 2002). According to Reynolds and Gutman (1988), 'laddering refers to an in-depth one-on-one interviewing technique used to develop an understanding of how consumers translate the attributes of products into meaningful associations with respect to self'. It involves a tailored interview format that uses a series of directed probes, normally typified by 'why is that important to you' questions (Reynolds and Gutman, 1988, p.12). There are, however, several disadvantages to laddering interviews (Durgee, 1985).

First, the interviews are both time-consuming and costly – although perhaps not more so than alternative procedures. Second, they require highly trained interviewers, although again the training should be no more difficult than for standard interviewing and the laddering approach might easily be added to interviewer training courses. Both of these factors might militate against using this technique to collect data from large, representative samples (Hofstede et al., 1999), although this problem can be overcome by using laddering on a small sample and then validating the interview data with a larger sample. A third disadvantage is that the laddering interview process may lead to participant fatigue and boredom, particularly as the questioning method is very repetitive (Glynis M. Breakwell, 2004). A fourth difficulty is that both the interview and the analysis can be affected by interviewer bias (Breakwell, 2004; Modesto Veludo-de-Oliveira et al., 2006)

3.8 Methodology chosen for the research

While ethnographic or a case study method might have been suitable for this research, grounded theory better facilitates a suitable methodology and mode of analysis, (Ibrahim, 2013). This is particularly due to its suitability for researching deeply into the area of OC and its influence on Lean philosophy and its suitability for generating a theory, (Goulding, 1998). Robson (2002) describes "*Grounded theory based research as one of the influential qualitative*

methodologies besides case studies and ethnography,” (pg 165). Furthermore, it provides the benefit of allowing the researcher to explore deeply into an unknown area such as human behaviour, (Robson, 2002). Howell, (2012) suggests grounded theory emphasises the interpretation of a situation and “*it is these interpretations which result in theory building,*” (Ibrahim, 2013, pg 123). In addition, grounded theory was used in this research in order to surface the perceptions of the member of the organizations (Glaser and Strauss, 1967; Lincoln, 1991; Partington, 2002) Considering the need of the topic at hand to enable the generation of a theory and framework, grounded theory presents itself as the most suitable method, (Strauss, Corbin). In addition to this it allows for a broader range of data sources to be utilised which enhances the opportunity to collect various perceptions and viewpoints on the topic being researched, (Glaser and Strauss, 1967).

The history of grounded theory begins at its inception in 1967 and founded by Glaser and Strauss. It was published in their book ‘*Discovery of Grounded Theory.*’ Glaser and Strauss were originally influenced by the ideas of Dewey (1922), Mead (1934) and Blumer (1969). Glaser and Strauss suggested that scientific truth lies from both observing and emerging consensus within a group of observers to make sense of what has been observed (Suddaby, 2006). The authors aimed to build abstract theoretical explanations for social processes which became revolution at the time challenged many ideas, (Charmaz, 2011). Some of the main ideas challenged include; beliefs that qualitative methods were unsystematic, the separation research phases involving data collection and analysis, ideas that qualitative research is merely a ‘precursor’ to more rigorous quantitative research, the notion that qualitative research was incapable of creating a theory, (Charmaz, 2011).

Glaser and Strauss (1967) were pioneers in providing written guidance for conducting systematic qualitative data analysis with clear analytic procedures and research strategy, (Ibrahim, 2013). Although later Glaser and Strauss took different paths with their own distinctive versions of grounded theory, (Javadi, 2013). In (1990) Strauss together with Corbin wrote a book called ‘*Basics of*

Qualitative Research : 1st Edition' announcing their perspective and their own version of grounded theory. Strauss and Corbin's (1990; 1994) paradigmatic position relates to an interpretative approach as opposed to Glaser, (1978, 1992), and Denzin and Lincoln (1994) Lean more towards a post positivist position, (Ibrahim, 2013). In 1992, Glaser provided further elaboration on grounded theory in his new book '*Basics of Grounded Theory Analysis*' and in this he responded to version Strauss and Corbin published challenging their ideas, (Javadi, 2013). In (1998) Strauss and Corbin then launched their 2nd edition providing more details on their coding system as a response to Glaser's challenges in 1992. After 1998 numerous other researchers and writers have added to the grounded theory debate proposing new perspectives which include, Locke (2007), Heath and Cowley, (2004), Charmaz (2011) and Corbin and Strauss (2008). These developments make it very important for researchers to make clear which version of grounded theory they are utilising. For the purpose of this research the Strauss and Corbin (1998) approach towards grounded theory has been selected and the rationale for this is discussed below. In addition, This research used grounded theory because of the following reasons:

- Grounded theory is an appropriate method for this research as there is no theory available that describes the phenomenon under study (Creswell, 2007, p.66).
- Most the models in the literature have been developed and tested under different samples, populations and cultures.
- It enables the researcher to "ground" the hypotheses in the empirical data: "Most hypotheses and concepts not only come from the data, but are systematically worked out in relation to the data during the course of the research" (Glaser and Strauss, 1967, p. 6). The methods used in an amalgamation of tools that were used to collect a lot of information and data from many sources. Literature, transcript of meetings, questionnaires answers, documents and studies were all used by the researcher to categorise the general and important information that could

help with explaining complicated social occurrences and therefore understand complex social phenomena (Glaser, 1978).

The grounded theory and the insider action research (Coghlan and Brannick, 2014) were used to explore this modern occurrence based in a real world setting (Yin, 2009). The action method is a cooperative approach of research between researcher and participants with the aim of solving problems and discovering new information. (Foster, 1972; Peters and Robinson, 1984; Argyris, Putnam and McLain Smith, 1985; Elden and Chisholm, 1993; Eden and Huxham, 1996; Gummesson, 2000; Greenwood, D.J. and Levin, 2006). The nature of this research is involving and work with SMEs manufacturing sector and the unit of analysis is SMEs manufacturing sector in KSA. (Daengbuppha, et. al, 2006).

Finally, The research was based on grounded theory methodology and a participative action research approach to uncover issues that clearly illustrated both the presence and intensity of aspects of organisation culture that enabled and inhibited lean implementation within an inductive approach. Due to the need to explore organisational culture it is beneficial to utilise qualitative research (Graham and Thomas, 2008). An inductive approach enables the researcher to become fully engaged within the research environment, thus improving the understanding of the culture being studied, facilitating more of an insider's view of the culture (Walker and Myrick, 2006).

Furthermore, it is important to note that most methodologies require extensive literature reviews to inform the research and identify the research question, as most research methodology is conducted with a deductive approach, (Dick, 2006). In contrast, grounded theory being inductive ends with a theory as opposed to beginning with a hypothesis and instead is used as a method for reviewing literature (Trochim and Donnelly, 2001). Hence why research hypotheses are made redundant in grounded theory is that the literature is generally used as a comparator (Dick, 2006).

A combination of issues and phenomenological approaches proposed by Sackmann (2006) was utilised due to its suitability to analysing OC. In addition

to this, the grounded theory method of Strauss and Corbin (1994) was adopted. Action research tends to be used for prompting conscious change within a somewhat controlled environment (Collis and Hussey, 2013). In this approach the participants and the researcher collaborate to find a solution to a problem (Coghlan and Brannick, 2014).

3.9 Data gathering methods

Data analysis in qualitative research deals with words, and the meanings implied by them (Miles and Huberman, 1994b). The analysis of the information gathered is done by discovering categories and their interrelationships. The program utilised for this in this research was NVIVO software for coding. The ability to identify categories and interrelationships is referred to as 'theoretical sensitivity'. Theoretical sensitivity is the '*ability to recognise what is important in data and to give it meaning*' (Strauss and Corbin, 1990, p. 46). Certain techniques can be utilised to help enhance this theoretical sensitivity.

3.9.1 Issue-focused investigation

In order to obtain a better understanding of the nature of OCs within SMEs in the manufacturing industry in the KSA, this study will focus on three main criteria: First, to expose the implied components of culture from an insider's perspective; Second, to be mindful of structural aspects of the culture for example sub- cultures, (Babbie, 2015); and Third, to facilitate comparisons to be made among individuals and research settings (Birkinshaw et al., 2011). The use of this criteria has enabled an issue-focused interview style that is founded upon phenomenological orientation leading to successive comparison (Birkinshaw et al., 2011). In addition; these focus groups and observations were utilised to provide triangulation of results. Issue-focussed investigation allows for the fulfilment of the above criteria. Due to the nature of culture being omnipresent, this makes it difficult for people to often reflect and describe when asked a question about it directly (Dey, 1999). Therefore, in order to draw this out it often requires a response to a stimulus requiring respondents to interpret

something, which is naturally done according to their own cultural basis as opposed to that of the researcher (Sackmann, 1991).

The choice of stimulus is also important. It should present a specific type of context yet be broad enough to allow freedom of interpretation, (Willis et al., 2007). This is important because when people are presented with something unusual they tend to access categories that already exist in their minds enabling them to process, understand and interpret (Denzin and Lincoln, 2011). The implied components of the culture are then usually made apparent in the interpretations provided by the respondents. Furthermore, issue-focussed investigation is particularly suitable because, by presenting them with a stimulus with a specific context, the respondents then tend to access the same library of knowledge already existing in their minds (Sackmann, 1991). This helps to uncover their framework about a specific issue. This then enables comparisons of the interpretations to uncover individual opinions from cultural beliefs that are common among the group (Willis et al., 2007). It is possible this can also help bring up subcultures (Denzin and Lincoln, 2011). The specific issues selected should be ones that are relevant to the participants and their roles within the organisation.

It is important for the selected participants to have some knowledge about the topic at hand so they can reliably discuss it as opposed to just guessing, (Plummer and Young, 2010). The issue/stimulus selected can be considered relevant for the organisational participants when they can provide three examples relating to this situation. The comparisons of the answers can reveal commonalities, themes or clear differences. Culturally based notions are mostly described in a consensual way as opposed to facts (Bryant, 2009). Thus, when presented with something unusual, people then seek out means of interpretation which pre-exist in their mind from their understanding of the organisation's reality. Issue-focussed investigation needs to be conducted cleverly to ensure the participants do not realise that particular issue is under investigation (Sackmann, 1991). Otherwise the responses can end up skewed or biased (Patton, 2014). In a longitudinal study such biases may reveal

interesting aspects, but it is too ambitious for a short-term study. Thus, the questions asked were issues focussed in accordance with Sackman's (1991) grounded theory approach:

- Tell me about an example you have seen lean implementation work well?
- Tell me about a situation where lean implementation has not worked well?

3.9.2 Phenomenological orientation

The phenomenological orientation has its focus on the insider's perspective and their beliefs and concepts, ideas of the OC and life within it. It places emphasis on the insider's view of what is considered important and relevant within that setting (Goulding, 2005). The researcher will put aside their own assumptions so these do not interfere or influence the respondent's answers. The emphasis is to allow the respondents to gradually unravel their own experiences. In order for the researcher to avoid making judgments based on their own beliefs, these should first be made clear (Annells, 1996). The interview procedure in a phenomenological orientation is close in style to an in-depth or intense interview. This usually consists of a longer introduction and a period of becoming better acquainted. This also gives the researcher the chance to gently introduce the subject of the discussion (Srubar, 1998). The aspects that are brought up by the respondent are the points that are then delved into with more detail. In doing so, the researcher is better able to explore together with the respondent and identify the cognitive frameworks that come up (Bryant, 2009). This process of an established dialogue also enables the researcher to check they have understood the respondent's point of view correctly. This can be done by the researcher mentally answering the question in their head before the respondent has a chance to check their own accuracy (Goulding, 2005). This type of research requires not only flexibility but a rapport to have been well-established between the researcher and the respondent because for in-depth issues to come to light the interviewee needs to feel comfortable, safe and that a mutual trust exists (Goulding, 2005).

3.9.3 The combination of Issue Focus and phenomenological orientation

There are some advantages to employing both an issues-focussed investigation and a phenomenological orientation. The latter is much unstructured and broad; however, the issue-focussed investigation works to narrow the scope giving more structure to the process. Furthermore, the researcher takes their cue from the respondents as to the most important aspects to be further explored (Sackmann, 1991). The respondents were asked to mention the aspects of lean principles they considered most important in their organisation (for example). They were also asked to explain why these were the most important. This enabled a cross- comparison of the responses of the individuals, increasing reliability. In the phenomenological phase, the researcher ensures all aspects of the factors brought up by the respondents are investigated (Bryant, 2009). Therefore, this particular approach by Sackmann (1991) was been selected for this research.

3.10 Building a theory

In applying grounded theory, one must be clear on the role of the researcher (Javadi, 2013). Many researchers have their particular field of speciality which often gives some basis from where to approach the research problem (Goulding, 2000). Their existing knowledge and information gathered from the literature review helps to mould a theoretical basis for approaching the topic to be researched (Walsham, 1995). Therefore, the aim of the literature review is to inform the ideas developed by other research to help generate a foundation which is essentially considered as a 'sensitising device' and can be altered only with actual findings and might lead to new discoveries (Klein and Myers, 1999). Glaser (1978) highlights that researchers must not lose theoretical sensitivity. This is because the researcher's professional and personal experience coupled with a deep knowledge of the data is necessary for the required sensitivity to create the categories and properties (Glaser, 1992). Strauss also agrees that the professional experience and acquired knowledge of the researcher is highly beneficial in the grounded theory process.

However, one must be careful to note that sensitivity is different to having preconceived ideas (Javadi, 2013). According to Glaser, *'we do not know what we are looking for when we start ... we simply cannot say prior to the collection and analysis of data what our study will look like'* (Glaser, 2001, p. 176). Methodologically, grounded theory provides a set of principles and heuristic devices as opposed to formulas (Atkinson, 2010). Moreover, it does not have limits on the range of data available to be utilised by the researcher (Atkinson et al., 2010). Researchers utilising grounded theory are thus expected to make their research formats clear by stating the phenomena they wish to study, its purpose, the method and sampling process, the data collection and generation procedures and their data analysis techniques (Suddaby, 2006). In the process of building a theory, the researcher will constantly be comparing the results of the interviews to information from the literature review.

3.11 Data collection

The tools generally employed to study culture consist of observations, structured, semi-structured or in-depth interviews, both with individuals and focus groups (Pearse and Kanyangale, 2009). Each of these qualitative tools have their own strengths and weaknesses. The types of methods generally utilised for studying culture in organisations are either a deductive mode of inquiry, which adopts an outsider's perspective, or an inductive approach, which is from an insider's perspective (Pearse and Kanyangale, 2009). Hypotheses are then established according to the relevance to the specific questions asked and tested. Therefore, the researcher is the onlooker and culture is considered a controllable variable (Sackmann, 1991).

For the purposes of this study an inductive approach was selected. When an inductive approach is utilised, the inquiry is conducted from the inside to better understand occurrences within the environment being researched, (Golden-Biddle and Locke, 2007). In this case, the information gained is specific to that particular context and is not able to be generalised. It is possible for concepts or hypotheses to emerge and this inductive approach treats culture as an integral

part of the organisation (Golden-Biddle and Locke, 2007); this is why it was chosen for this study and fitted within the constructivist approach.

3.11.1 The use of Literature review

Strauss and Corbin (1990) have identified two kinds of literature: technical; and nontechnical. Both are relevant for analysis using the grounded theory and can be applied at the same stages of the process. Technical literature consists of theoretical, philosophical and empirical research and is useful for comparing and contrasting against the findings identified from the grounded theory (Strauss and Corbin, 1990). Nontechnical literature is made up of other documents, for example, statements, testimonies and journals and are used as a support for the collated information.

The literature review carried out for this study examined the concepts and experimental research based on Lean culture to explore the present thoughts on this topic. This review didn't result in any hypotheses but did provide an understanding of the information. Therefore the grounded theory method was the best option for this study. In addition, the technical information gathered from the literature was useful for comparing against the results obtained in this study. The nontechnical literature was important for reinforcing new factors that came out of the study.

3.11.2 Interviews

Interviews are open-ended questions gaining in-depth responses about people's experiences, perceptions, opinions and feelings and knowledge (Taylor, 2005). Structured interviews have been criticised for their reliability, because similar to questionnaires, respondents tend to conform to the culture of the researcher as opposed to the culture being researched (Pearse and Kanyangale, 2009), although this can be mitigated if they are developed on a foundation of knowledge gained within the research setting (Patton, 2014). In depth interviews/ unstructured interviews are often utilised to help expose culturally based values, (Patton, 2014). The key here is, the researcher should not introduce cultural values, but instead use open-ended questions and the

insider's own language, which helps evoke responses revealing the aspects of everyday life in that cultural setting (Creswell, 2013).

The weaknesses associated with in-depth interviews are: First, the process of trying to separate an individual's opinion and cultural information; and Second, ensuring objectivity and reliability of the information (Taylor, 2005). It is important for the researcher to be conscious of their own biases and influences in the information-gathering process (Patton, 2014). Objectivity in the information analysis phase can be created by utilising different people to analyse the same information (ibid.).

It is important however, for the assisting analysts to also have an understanding of the research setting from an insider's perspective (Sackmann, 1991). For this research semi-structured interviews were also utilised. The advantage with semi-structured interviews is that they ensure certain topics are covered making them more comparable and easier to obtain reliable qualitative information (Patton, 2014). Furthermore, it allow the interviewee to bring up other aspects that they also consider relevant or important, which is key to grounded theory methodology (Miles and Huberman, 1994b). For the interviews, the participants selected from each company included managers, production engineers and factory floor employees. It is considered important to include all levels of employees in the interview process as all are equally important to lean implementation as well as the overall OC (Angelis et al., 2011). The semi-structured interview in this research was utilized to explore the factors that affecting lean implementation in terms of organisational culture, by using an issue-focused investigation approach (Sackmann, 1991).

3.11.3 Observations

Participant observation involves 'fieldwork descriptions of actives, behaviours, actions, conversations, interpersonal interaction, organisational or community process, or any other aspect of observable human experience' (Taylor, 2005). This generally involves spending an extended period of time being immersed in the research setting. An advantage with observations is that they do not require prior knowledge and the concepts are established inductively (Cook and

Yanow, 1993). However, it is a very time-consuming process and can be very expensive. Teams of researchers can be utilised, although this can create issues because each person does discrete as opposed to replicative work, which creates validity and reliability problems (Taylor, 2005). Furthermore, researchers have the challenge of looking beyond their own cultural biases and interpreting and reporting information about another culture (Patton, 2014). During the observations, the interactions between colleagues and managers were observed. Also, interactions between colleagues themselves, participant behaviour during the interview, reports and any other printed materials were also observed. Also, their working style, how they process systems, the kinds of relationships between them and even notice boards and the layout of the offices and factory and their emotions and moods will all be noted (Taylor, 2005).

3.11.4 Focus groups

Focus groups are another tool for revealing cultural assumptions, according to Schein (1985), '*because the group provides the stimulus to bring out what is ordinarily hidden.*' This data gathering tool was first developed in the 1920s and has since been utilised in social sciences (Frey and Fontana, 1993). Although focus groups may not always achieve the same depth as one-to-one interviews, they are still very useful (Patton, 2002). Focus groups are considered to be useful particularly in exploratory studies, which aim to gain a greater understanding of a social context (Fontana and Frey, 1994). The group dynamic can create clearer distinction of individual opinions from cultural beliefs and reveal taboos (Sackmann, 1991).

A particular advantage associated with focus groups is the opportunity for participants to hear other's views, which can generate varied responses as the discussion develops (Kolb, 2012). Focus groups also serve to validate any ideas the researcher may be wishing to confirm (Jones and Noble, 2007). Furthermore, it helps to provide an opportunity for understanding group dynamics which might affect individual's perceptions (ibid.). Researchers need to be skilled in order to draw out the more hidden aspects while also being aware of their own cultural biases (Taylor, 2005). The researcher conducted the

focus groups in each company in a meeting room, and they were also be recorded to enable accurate revision and analysis of the data. For this research the researcher organised groups of around eight to 12 participants and time frame was set between one to two hours (Gray, 1998). They were conducted face to face with everyone together in a meeting room and snacks and beverages provided.

The main premise of the focus groups for this research was to utilize an action research approach in that the participants refined the aspects, named the categories while providing the data under each category, thus it reflected the ideas and perceptions of what is important to the employees.

3.12 Data Analysis

According to Kent (2001), data analysis takes place after the data has been collected with the ultimate aim of processing it in order to generate information that can be used to achieve the research's objective. The sections below will outline the data analysis procedures from simultaneous, concurrent data collection, content analysis and grounded theory coding analysis.

3.12.1 Simultaneous and concurrent data collection

In grounded theory, data collection and analysis occur concurrently, enabling the research to being analysis as soon as the data emerges, (Corbin and Strauss, 1990). According to Strauss and Corbin (1990) '*data collection and analysis systematically enables the research process to capital all potentially relevant aspects of the study as soon as they are perceived*' (p. 6). Thus, the data is analysed looking for all the possible interpretations from the very beginning (Goulding, 1998). To ensure nothing is missed it is recommended that the researcher should start analysing the first set of data for ideas and leads (Ibrahim, 2013). The benefit of this is it provides the researcher with clues on what to include in the next stage of interviews (Goulding, 1998). Thus, demonstrating the process of data collection and analysis in concurrent as opposed to linear and conceptual theorising occurs from the inception of the research process (Boychuk Duchscher and Morgan, 2004).

3.12.2 Constant comparison method

The constant comparative method is utilised by the researcher to create concepts from the data gathered, which involves coding and analysing at the same time, (Taylor and Bogdan, 1998). This method '*combines systematic data collection, coding and analysis with theoretical sampling in order to generate theory that is integrated, close to the data and expressed in a form clear enough for further testing*' (Scott *et al.*, 1993).

The constant comparative method involves four stages:

- *Comparing Incidents applicable to each category*
- *Integrating categories and their properties*
- *Delimiting the theory*
- *Writing the theory* (Glaser and Strauss, 1967, p. 105).

During these four stages the researcher is continuously sorting through the data collection, analysing and coding the data and reinforcing theory creation by theoretical sampling, (Kolb, 2012). Therefore, incidents that are deemed to be similar are grouped together under concepts (Corbin and Strauss, 2008). Constant comparison is designed to help the researcher in creating a theory which is fully integrated and consistent with the data, which has also be a source of validity in grounded theory research (Silverman, 2006).

3.12.3 Content analysis

It was decided that the tool best suited for information analysis was content analysis. Krippendorff and Weber (1987) explained that this makes use of a set of guidelines that guarantee relevant results. It goes behind the basic data and examines the content in its original form, the topics and basic ideas. This process also uncovered further relevant factors from the information, which led to a reworking of the original framework. One of the benefits of content analysis is the ability to refer back to the original data to check for any omissions or incorrect categorisation (Woodrum, 1984). Woodrum states that content analysis allows the researcher to examine outlooks, companies and human

interaction (1984). the disadvantage of this is researcher bias, so actions need to be taken to protect against these.

3.12.4 Coding procedures

Strauss and Corbin (2008) refer to the analysis of data as coding. This involves three different levels of analysis, open coding, axial coding and selective coding, which are discussed below.

Open Coding

Open coding can be defined as, '*the analytic process through which concepts are identified and their properties and dimensions are discovered in data*' (Strauss and Corbin, 1998, p. 101). Throughout this process the data are analysed very closely and compared against each other to detect similarities or differences (Strauss and Corbin, 1998). Open coding is the first stage of grounded theory analysis which according to Strauss and Corbin is to 'open up the inquiry' (ibid.). During this phase the data is broken down into smaller segments, reviewed and developed into concepts and categories (ibid.). Open categories refer to concepts generated from the data which help to describe the phenomena which is held important by the participants (Glaser and Strauss, 1967).

Properties are the narrowed down attributes of a category and dimensions refer to the location or positioning of a property across a continuum (Strauss and Corbin, 1998). A number of techniques are available in order to assist to open up the line of enquiry, such as basic questions like who? What? When? Where? Why? and How? Also available is temporal questioning such as frequency and duration or timing (Javadi, 2013). The 'flip-flop' technique refers to the consideration of opposite characteristics, and 'red flags' refers to when an interviewee mentions a situation, which according to them never occurs or always occurs, requiring the researcher to determine any possible exceptions (Javadi, 2013). Open coding can be done by line-by-line analysis, sentence or paragraph analysis or also by going through an entire document and looking at it as a whole (Strauss and Corbin, 1998).

Axial Coding

Axial coding refers to the process of linking themes and issues together based on a relationship and is usually done on an inductive and deductive basis (Strauss and Corbin, 1998). In this process according to Strauss and Corbin (1990) is to put the information together in a new way by identifying links between categories and subcategories. This is done via the coding paradigm which includes conditions, action and consequences (Strauss and Corbin, 1998). However, Glaser (1992) criticises this by instead utilising selective coding, which codes around a core category with a greater emphasis on theoretical coding (Stern, 1994). Glaser suggests that coding for solely what is in the data and allowing for emergence then verification will occur automatically (Stern, 1994). Although according to Dey (1999), Strauss and Corbin emphasise the importance of implementing the 'doing paradigm' in axial coding and the paradigm includes most of Glaser's (1978) 18 coding families. Essentially Glaser puts theoretical coding after selective coding, but Strauss puts axial coding before selective coding. If the coding paradigm is intended to replace the theoretical codes, it is unclear as to why Strauss and Corbin changed the original order (Walker and Myrick, 2006). Walker and Myrick (2006) suggest that Strauss and Corbin aim to make the procedure more obvious, albeit somewhat more complicated.

In terms of verification Glaser states, "*The line by line approach forces the analyst to verify and saturate categories,*" (Glaser, 1978) which is the way in which theories become grounded. Strauss and Corbin approach verification in another way which involves constant shifting between inductive and deductive thinking which they believe makes the theory grounded, (Strauss and Corbin, 1990). According to Glaser (1992) they in fact are using the constant comparative method, analytic tools and the coding paradigm but it requires them to go back and verify their findings. Strauss and Corbin, (1994) suggest verification is achieved through an inductive process. According to Glaser (1992) by utilising constant comparison when done properly ensures the accuracy of the work. The "*interplay between induction and deduction*" Strauss

and Corbin (1991) refer to is basically the interpretative process utilised to account for the human element in the data analysis. Strauss and Corbin's perspective appears clearer in terms of how to integrate the categories and their subcategories, (Walker and Myrick, 2006). Strauss and Corbin (1990) suggest that axial coding may seem complex but so is reality. The process can be simplified by utilising a framework as seen below.

Table 3-4 Strauss and Corbin Axial Coding (Source: Strauss and Corbin, 1990)

Element	Description
Phenomenon	This is the frame, the concept which links all the other variables together.
Causal conditions	This refers to events which trigger the development of the phenomenon.
Context	This can be difficult to differentiate from causal conditions however; it refers to background variables which influence the action. A distinction can be that these are usually less interesting than the causal conditions.
Intervening conditions	These are generally said to have mediating factors thereby explaining the relationship between dependant and independent variables.
Action Strategies	Activities done with a particular goal as a response to the phenomenon and intervening conditions.
Consequences	The consequences of the action strategies which may be intentional or unintentional.

Selective Coding

This refers to selecting one category as the core concept and linking all other categories to this particular one. Glaser's (1978) work is brought together using theoretical coding and Strauss and Corbin (1994) use selective coding. Theoretical coding can be defined as using theoretic codes *'to conceptualise how the substantive data may relate to each other as hypothesis to be*

integrated into a theory' (Glaser, 1978). These come from cues in the data that help to bring the pieces together. Selective coding, according to Strauss and Corbin (1998), is '*the process of integrating and refining the theory*'. In their process, the core category relates to all other categories. Selective coding is similar to axial coding, only that integration happens at a more abstract level on analysis (Strauss and Corbin, 1990). Strauss and Corbin's selective coding revolves around selectively coding around a core category (Walker and Myrick, 2006).

3.12.5 Paradigm model

Paradigm model for this research is used inside grounded theory method to emphases analysis. The model has a set of relationship as discussed above.

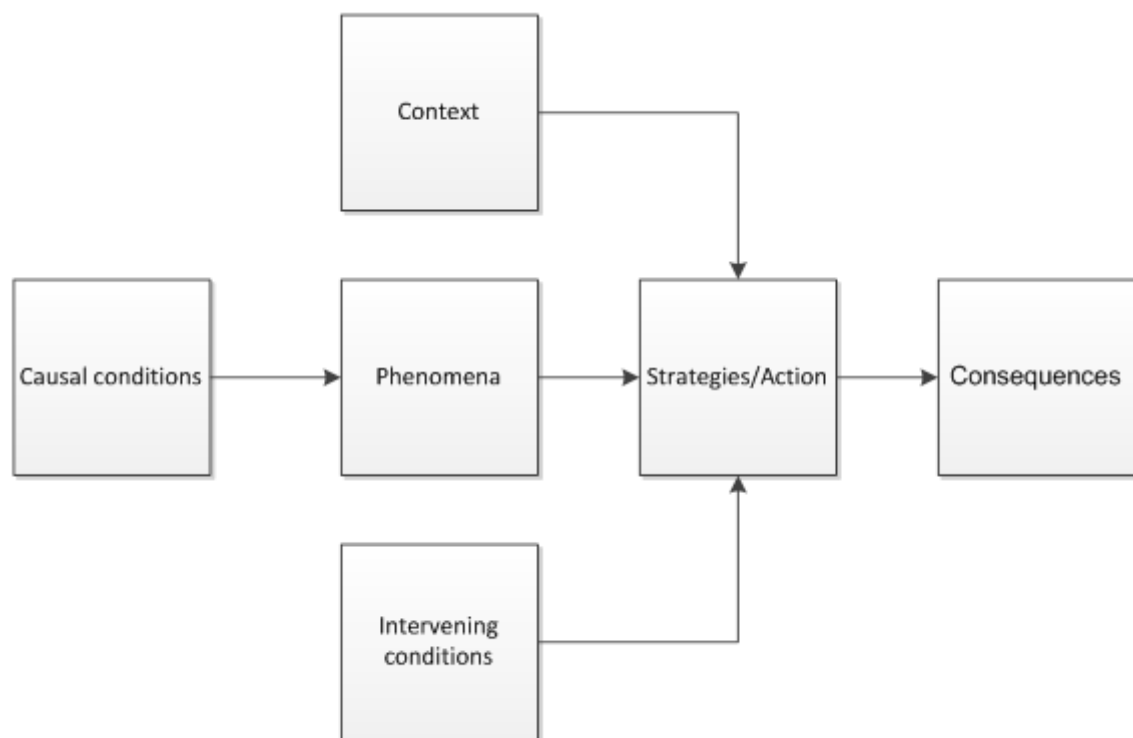


Figure 3-6 Paradigm Model Adopted from Strauss and Carbon, (1990, p.99) and Creswell (2007, p.293)

3.13 Rigour in the research

'A trustworthy study is one that is carried out fairly and ethically and whose findings represent as closely as possible the experiences of the respondents. (Padgett, 2008, p. 184).

Between qualitative and quantitative research there are many differences to respect with evaluation (Guba and Lincoln, 1989). Quantitative research is evaluated on the basis of reliability and validity (Lietz and Zayas, 2010, p. 190). Mason (1996) suggests that reliability, validity and generalisability vary in terms of measurement of the quality and rigour of the study and its potential to be applied to broader situations. Validity can be defined as *'whether you are observing, identifying, or measuring what you say you are'* (Mason, 1996, p. 24).

In contrast, LeCompte and Goetz (1982) refer to reliability and validity by distinguishing between *'external reliability'* and *'internal reliability'*. External reliability refers to the extent to which a study is able to be replicated. Some recommended strategies for duplicating qualitative research is to take on a comparable role taken on by the original researcher, (Bryman and Bell, 2015) Internal reliability refers to if there are numerous observers or just one, and the agreement among the observers of what they are exposed to. Internal validity refers to how well the observations made by the researcher match the theories they comprise (Bryman and Bell, 2015).

According to LeCompte and Goetz (1982), internal validity is a key strength available to qualitative research, especially where the researcher spends a high period of duration within the research environment thus helping to ensure the strength of compatibility between concepts developed and observations. External validity refers to the extent to which the results are able to be generalised over various social situations (Bryman and Bell, 2015). According to LeCompte and Goetz (1982) this is the most problematic area for qualitative research, as it tends to utilise smaller sample populations and is used for case study purposes. External validity addresses the areas of reliability and

generalization. The focus of qualitative research is to form unique impressions and understandings of events rather than to generalize the findings (Creswell). Generalization in a qualitative study is enhanced by carefully examining the extent to which the development of the grounded theory can be applied to other cases (Bickman & Rog, 2008). The

However, (Guba and Lincoln, 1994) propose a further method for evaluating qualitative research based upon four criteria:

- i. Credibility, which refers to internal validity
- ii. Transferability, referring to external validity
- iii. Dependability, paralleling reliability
- iv. Confirmability, which refers to objectivity.

Their reasoning for challenging the notion of merely assessing reliability and validity is due to its assumption that an absolute count of a social situation is possible (Bryman and Bell, 2015). Guba and Lincoln (1994) however, hold that more than one absolute truth is possible in multiple situations. Therefore, this emphasis on multiple accounts for social realities is particularly relevant when considering the criteria of credibility in qualitative research. Furthermore, if a number of possible accounts of an aspect of a social situation are possible, it is the credibility of the account that will ultimately determine how acceptable it is. This is essentially where respondent validation becomes an important factor. Triangulation is also another technique that is recommended to deal with this issue (Bryman and Bell, 2015).

Since qualitative research is more subjective, reliability and validity are in compatible with it. Lincoln and Guba (1985; 1989) have developed four criteria as mentioned above. These guiding principles are used to evaluate qualitative research and should not be rules for using validity and reliability inside positivist research (CARPENTER and SUTO, 2008, p. 150; Lietz and Zayas, 2010). These criteria are listed in Table 3-4.

Table 3-5 Criteria for ensuring rigour in qualitative research (Liamputtong, 2009)

Rigour-critical	Criteria for rigour	Research strategy	Techniques to insure rigour
Credibility	Truth value		Purposeful/theoretical sampling
		Field notes/ memo	Negative/deviant case
		Tape recorder	Constant comparison
		Thematic log	Member checking
		Auditing transcript	Triangulation
			Audit trial
Transferability	Applicability	Data display	Purposeful/theoretical sampling
		Simultaneous literature review	Thick description
Dependability	Consistency	Field notes/ memo	
		Tape recorder	Negative/deviant case
		Thematic log	Member checking
		Auditing transcript	Triangulation
		Researcher's story	Audit trial
		Reflexivity	
Confirmability	Neutrality	Filed notes/ memo	Audit trial

3.13.1 Credibility

'Interpretations must be authentic and accurate to the descriptions of the primary participants.' (Drisko, 1997).

Reliability and authority of the research is judged by its credibility (Liamputtong and Ezzy, 2009, p. 21). The idea here is the description should be fitted with the explanation (Tobin and Begley, 2004, p. 391). Credibility should fit between how the researcher represents their viewpoint and what the participants said so as to control the risk of reactivity and bias (Padgett, 2008). Lietz and Zayas (2010, p. 191) define reactivity as: *'The potential for the researcher to exert an impact on the participants thereby changing the findings of the study.'* The way the researcher behaves or asks questions during the interview can raise reactivity. To achieve credibility in the current research two main strategies were adopted:

1. Applying selection techniques to the participants regarding their knowledge, characteristics and their experience. Moreover, theoretical sampling gives credibility to the research (CARPENTER and SUTO, 2008).

When the interpretation and description can be recognised by the participants, i.e. 'when *the multiple realities held by participants are represented as accurately and adequately as possible*' (Liamputtong and Ezzy, 2009, p. 21). Therefore, it can be achieved (Johnson and Waterfield, 2004)

3.13.2 Transferability

Transferability is the capability to apply the findings of the research to other settings, situations, contexts, events, individuals or groups (Padgett, 2008). In other words, it is the degree to which finding can be applicable to other settings or contexts (CARPENTER and SUTO, 2008, p. 149). In-depth descriptions about the phenomenon being studied should enable other researchers to understand whether the findings are applicable to fit into other settings and contexts (Devers, 1999; Lietz and Zayas, 2010).

3.13.3 Dependability

Dependability (auditability) is the degree to which the study is documented to allow other researchers to trace and follow the research process (Padgett, 2008). Dependability is confirmed when the research process is well documented and tractable (Tobin and Begley, 2004, p. 392). Therefore, it can be compared to reliability (Liamputtong and Ezzy, 2009, p. 22). Dependability thus means to make sure that the findings fit to the derived data (CARPENTER and SUTO, 2008, p. 150).

The idea behind dependability is based on repeatability. Consequently, it is concerned whether the researcher is capable or able to obtain the same result from the findings of the research if he/she observes the same phenomenon or more than one. However, a researcher cannot obtain the same output from the research because he/she is measuring two or more than two different things. Therefore, the researcher should give in detail a description of the changes that take place and how these changes influenced the way the research was

approached. For example, (Lietz and Zayas, 2010, p. 196) state, '*one way of addressing the need to make decisions and changes along the way is to provide detailed documentation throughout the research project.*' Therefore, '*keeping an audit trail and engaging in peer debriefing*' are two strategies that shape dependability (Lietz and Zayas, 2010, p. 196).

The audit trail is a written, detailed report of the research process that should describe what exactly happened during the research. Here, a journal of observations and significant event was maintained throughout the research. This journal suggested by Coghlan and Brannick (2014) to record reflections and thoughts on observed events and also to write down any comments made and to support a timeline for the significant events that occurred during the research process. This provided an opportunity to observe and record all teams in the firms and their actions that were relevant to the research. The use of a journal facilitated triangulation of events and observations on aspects related to the OC.

In addition, peer debriefing is used to consult other experts (colleagues) in qualitative research approaches, discuss and explain procedures and decisions to obtain feedback that can enrich the quality of the research (Padgett, 2008).

3.13.4 Confirmability

Confirmability is the ability and capability of other researchers to confirm the research result (Lincoln and Guba, 1985). It confirms that the results from the research are linked to the data (Padgett, 2008). It can also be defined as the degree to which result are specified by respondents and not by the perspective of the researcher (Lincoln and Guba, 1985, p. 290). Therefore, confirmability can be achieved by presenting the data from the research and the analysis steps leading to the result (Alkhoraif and McLaughlin, 2018a).

3.13.5 Respondent Validation

This refers to the process where the researcher reports back to the population from which the research was gathered an account of the findings. Thus, ensuring sufficient correlation between their result and the perspectives of the research population (Bryman and Bell, 2015). This also gives the research the

opportunity to identify aspects of the observations that might be incongruent to the social reality. It is important to realise that this can at times prompt defensive reactions or even for information to be made 'off the record' from research participants. This is sometimes due to personal accounts leaving individuals too vulnerable (Bryman and Bell, 2015). Another criticism involving this approach is whether research participants are appropriate to validate the analysis of a researcher as the findings are designed for a completely different audience (ibid.). Therefore, while this approach might achieve a corroborative response from the research participants, the researcher will still be required to move forward through concept development and theories. Thus, there needs to be clear boundaries regarding research results that participants have control over and which material is crucial for academic reasons (Silverman, 2006).

3.13.6 Triangulation

The term triangulation was coined by Webb, Campbell and Schwartz (1966) and refers to '*using more than one method or source of data in the study of social phenomena*' (Bryman and Bell, 2015, p. 397). It was established as a method for the development of measures to create a higher level of confidence in research findings. Ethnographers will often utilise this method to cross check their observations with interview questions to mitigate any misunderstandings (Bryman and Bell, 2015).

Because qualitative research tends to involve the study of smaller groups with greater emphasis on depth as opposed to breadth, the contextualisation and uniqueness of the findings is generally high (Silverman, 2006). Therefore, researchers are encouraged to adopt 'thick description' of a culture, which involves creating a comprehensive database for others to make their own judgements for the transferability of the results (Bryman and Bell, 2015).

In terms of dependability, Guba and Lincoln (1994) propose that detailed records of each research phase are kept to enable ease of auditing the research gathering and findings. Although this is often troublesome with qualitative research, which tends to gather particularly large datasets. Furthermore, Guba and Lincoln (1994) encourage the use of the authenticity

criteria. This includes attributes such as fairness in terms of representation of viewpoints, discerning how well the research enables a better understanding of the social situation, its ability to create a better appreciation for the perspectives within the social situation, its ability to prompt change among its members, and how well it empowers the members to make appropriate changes (Bryman and Bell, 2015). Thus, the practical outcomes of the research are emphasised.

Denzin (2017) located four kinds of triangulation, which were all applied and adopted to this research.

1. Using multiple methods such as observation and in-depth interview together in the research (Padgett, 2008). This drives the validity of the research, as the same result are alignment and confirmed through different methods in the research.
2. Researcher triangulation, which refers to there being more than one researcher conducting the research either by collecting data, observing and analysis (Winston and Heiko, 1990).
3. Source triangulation or data triangulation, by using multiple quotations, collecting data from many different locations and involving multiple participants (Winston and Heiko, 1990, p. 238; CARPENTER and SUTO, 2008, p. 153).
4. The last kind is called theoretical triangulation, using different theoretical frameworks within the same research or study in order to interpret the result from the study (Padgett, 2008).

3.13.7 Inter-rater reliability

Cohen (1960) discussed that according the psychology area there is some situation in clinical-social-personality, it occasionally occurs that the best useful level of measurement degree attachable in nominal scaling. In this research, assessment of the inter-rater reliability took place in early stage of the analysis process. The procedure is that having two or more judges independently to determine the significance, degree and sample stability of agreement (Rashid, 2010). Gwet (2002) provide that evaluation of the extent of the agreement between two or more raters is commonly used in social, medical and

behavioural sciences. He gave an example of a reliability experiment where two raters (A and B) classify N subjects into one or two potential responses, i.e. (1 or 2) (Yes or No); the categories are suggested as being disjointed (no overlap) (Rashid, 2010). Table 3-5 shows how Gwet's categories are modelled.:

Table 3-6. Distribution of subjects (Gwet, 2002; adapted from Rashed, (2010)

		<i>Rater A</i>		
<i>Rater B</i>	Yes	No	Total	
Yes	A	b	B (Yes) = a + b	
No	C	d	B (No) = c + d	
<i>Total</i>	A (Yes) = [a + c A (No) = b + d]		N	

where: *a*: Total number of subjects classified as (Yes) units by both raters; *b*: Total number of subjects classified as (Yes) units by rater B and as (No) units by rater A; *c*: Total number of subjects classified as (Yes) units by rater A and as (No) units by rater B; and *d*: Total number of subjects classified as (No) units by both raters (Rashid, 2010).

There are two measures commonly used in inter-rater reliability, namely Cohen-Kappa (K) and percentage of agreement (%) (Gwet, 2002; Hsu and Field, 2003). Their formulations are shown below:

1- Cohen's Kappa method

$$K = (F1 - F2) / (N - F2) , K= 0.00 \text{ to } 1.00$$

Where, $F1 = a + d$

$$F2 = [(a + b)(a + c) + (b + d)(c + d)] / N$$

$$N = a + b + c + d$$

The degrees of agreement indicated by Kappa are given in the Table 3-6 below:

Table 3-7. The degree agreement between the raters (Huddleston 2003; Rashed, 2010)

K Value ranges	Degree of Agreement between raters
0.08 – 1.00	Almost Perfect
0.60 - 0.79	Substantial
0.40 - 0.59	Moderate
0.20 - 0.39	Fair
0.00 - 0.19	Slight
≤ 0.00	Poor

2- Percentage of agreement method

The formula of percentage of agreement is $[(a + d) / N] * 100 \%$.

Table 3-7 shows the level of agreement between raters according to their percentage of agreement.

Table 3-8. Percentage level of agreement between the raters (Huddleston 2003; Rashed, 2010)

Percentage ranges	Level of Agreement between raters
91- 100	Very high
81 – 90	High
71 – 80	Moderate
61 – 70	Fair
51 – 60	Slight
≤ 50	Poor

3.13.8 Validating translation

The first step in the data analysis process was to transcribe the recorded interviews into text. The second step, since most of the interviews were in Arabic, was for the researcher to produce an English translation of the text. The translation was submitted and applied to again inter-rate reliability by academic researchers fluent in English and Arabic, to make sure that the translation was correct and validated. Thirty percent of the total interviews were randomly selected and reverse translated using different translators. This double-checked that the original translations had sufficient reliability with no discrepancies (Regmi et al., 2010)

3.14 Framework validation

Expert opinion was used in this research (expert defined as a person with exceptional knowledge or skills on a specific topic, Oxford Dictionary, 2014) to give validity to the results of the study. Not only do these experts provide an element of legitimacy, but they were invaluable for directing the researcher's perception of the topic being exploring (Achanga, 2007). It is important to use only experts who have experience with the research topic (Fink, 1998).

The researcher identified experts who were experienced in the specific field, who were consultants with knowledge of KSA manufacturing, who are published writers on KSA manufacturing sectors (researchers or lecturers from KSA University) and core staff from consulting organisations who have control over policymaking and policy implementers. This was acting on recommendations from Achanga (2007) who stated that experts need sufficient, relevant experience and current knowledge in the topic under investigation.

3.15 Research Process Phase

The research process was divided into three phases as shown in Figure 3-7. The following sub-section will explain each phase.

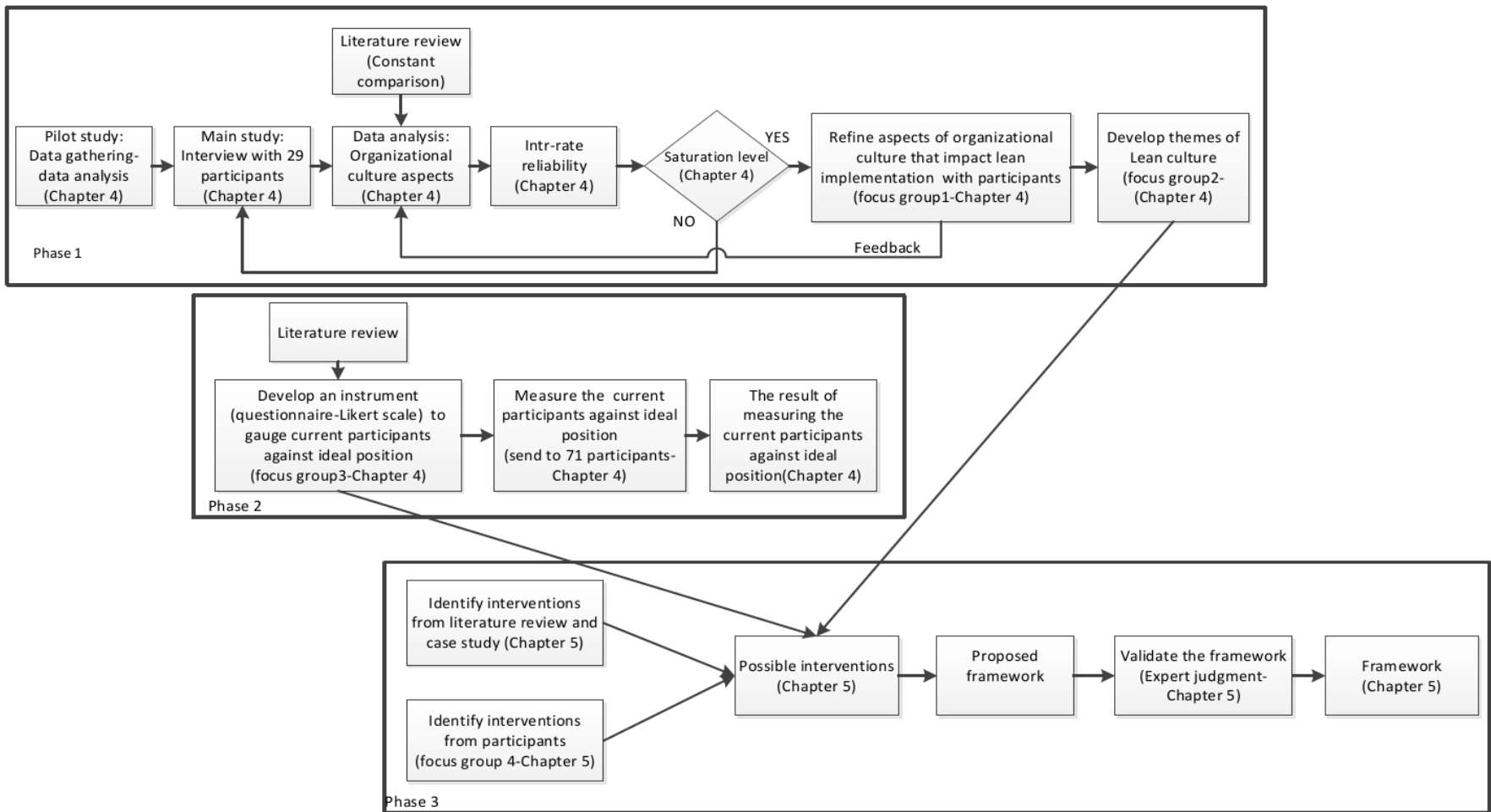


Figure 3-7 Research Process Phases (source: by researcher)

3.15.1 Phase One

To begin this phase, a literature review was conducted in order to increase the researcher's understanding of the scope of research on the topic of the enablers and inhibitors of LC in SMEs; much of the literature pointed to OC as being an important factor as to why lean implementation was largely unsuccessful (Angelis *et al.*, 2011). Therefore, this prompted the researcher to further explore what has been studied regarding lean philosophy and OC to identify enablers and inhibitors in this area. The literature review has also helped to broaden the researcher's scope of knowledge and theories pertaining to the topic.

In relation to the literature review the researcher has also utilised Scopus, ABI/INFORM Collection, EBSCO, IEEE, and Website Science, ScienceDirect, Emerald, SAGE, Inderscience and Taylor and Francis as sources for OC, enablers and inhibitors of lean implementation overall and specifically for SMEs. After the review, the researcher commenced a pilot study. Two SMEs in the manufacturing sector in Saudi Arabia were selected in which interviews with managers and employees were conducted. From these results the researcher was able to gather a list of OC enablers and disablers for lean practices in SMEs in Saudi Arabia. The researcher then compared and contrasted this list with the information found in the literature review.

The new data that emerged from the pilot study identified aspects which appeared from the perspectives of the participants not the researcher (Strauss and Corbin, 1998). The data was analysed with NVIVO software. The pilot study also provided the opportunity to test the questions provided in the seven interviews conducted in the organisation to help to reduce bias and research errors in terms of types of questions provided. An important task is for all researchers to make known their perceptions and thoughts on the issues and topics before research formally begins. This is crucial to mitigating bias in the research process, (Annells, 1996).

Then, the research moved to the main study to conduct 29 interviews including the pilot study interviews. Then, all the interviews were analysed and compared with the literature review. Tests of inter-rater reliability were utilized in this stage to evaluate the results. When the results reached the saturation level, the researcher moved to the first focus group to refine the aspects that were analysed from interviews. The final step in first phase was Focus Group Two, the purpose for this was to involve the participants in aggregating the aspects into high level themes and locate all the themes within Schein's model.

3.15.1 Phase Two

The second phase was marked by the beginning of developing an instrument to gauge the current perception of the participants against the ideal position of the themes. Ideal position were the manufacturing SMEs where it should be to aspire the most effective Lean (Alkhoraif and McLaughlin, 2018b). This involved the participants from Focus Group Three and the literature review to design the assessment. This drove a joint review of the assessment results and their relevance to the organisational culture. In order to gauge the organisational culture more specifically, an assessment tool based on the organisational culture theme description was participatively developed with the participants. A Likert scale was used for this questionnaire to gauge current perception of participants against the ideal positions. A series of short statements relating to each of the seven themes were developed with the team in Focus Group Three to describe an ideal position of the required organisational culture. Statements for each theme indicated the ideal position organisational culture for lean implementation. The participants assessed their perception of the organisational culture by gauging how close they perceived they were to ideal position of the seven themes, reflecting the ideal position of the organisational culture for manufacturing SMEs. The questionnaire was sent to the participants by email. A total of 71 responses were returned. All the scores were added together and averaged to produce a group perspective of the participants' position against an ideal position for organisational culture.

3.15.1 Phase Three

In this phase the researcher conducted selections of possible interventions from literature review, work place and from Focus Group Four. The selection of interventions were based on themes and ideal positions that were generated from Focus Group Three and from the literature review. It was during this phase that the framework development began. Here the researcher selected the proposed interventions and systematically related this to themes and validate those relationships by expert judgments as the final phase of the research (Strauss and Corbin, 1990).

3.16 Framework development

According to Glaser (1978), the aim of grounded theory is to create a conceptual theory that includes a pattern of behaviour which is both relevant and problematic for the participants. The continual resolving is 'designated by a category called the core category' (Glaser, 1978, p. 199). With regard to the role of grounded theory in terms of theory development, the methodological boost provided by grounded theory to qualitative research is in the development of theory, which necessitates developing concepts and their linkages to identify variations characterising the phenomenon (Strauss, 1987). In addition, theoretical sampling is a process that is often used alongside the coding process (Kolb, 2012). Whilst open coding (aspects) is taking place, sampling has a clear direction and it is systematic.

From the interviews all the results were constantly compared to the information found in the literature review. During the focus group the process of themes became more structured in order to validate relationships within the data and the agenda becomes more deliberate in order to integrate the findings within the themes to achieve data saturation (Strauss and Corbin, 2008). Data saturation refers to the stage when the data collected in the research is now redundant (Bogdan and Biklen, 2007). This is necessary to ensure enough data has been collected to reflect the perspectives of the research participants (Kolb, 2012).

From a research perspective, grounded theory has the ability to promote sensitivity, prompting of research questions, pointing to direct theoretical sampling and assists in providing valid outcomes (Strauss and Corbin, 1990). It is these benefits which according to McGhee, Marland and Atkinson (2007) assist the researcher to give a justification for the research and avoid any conceptual and methodological obstacles (Ibrahim, 2013). According to Strauss and Corbin (1998), *'this method aims to understand the nature of human activity within organised setting and supports the construction of theory from the qualitative data gathered,'* (Ibrahim, 2013, p. 141). Thus, theory is constructed from the themes, and data within each theme.

A series of short statements relating to each of the themes were developed with the team in Focus Group Three to describe an ideal position of the required organisational culture. Finally, a suitable set of interventions was developed that would be applicable to SME manufacturing in the form of a strategic action plan, based on empirical examples of interventions designed to develop a lean culture to facilitate lean implementation. The proposed interventions comprised a series of linked management actions in the form of a framework to shift the lean culture of the SMEs closer to an ideal position of a desired lean culture. The desired outcome from the research is an outline of a framework of interventions designed to create the conditions of an organisational culture that will facilitate lean culture. The framework can be planned and put together fitting centrally around the theory that has been generated.

3.17 Ethics consideration

Stake (2000) believes that qualitative researchers are 'guests in the private spaces of the world' (p. 244); consequently, their manners should be 'good and their code of ethics strict' (ibid.). Willig (2008) likewise reminds researchers that naturalistic studies are concerned with the details of life events of individual participants. Bearing these reminders in mind, every effort was made to undertake the best ethical practices, seeking to ensure that there was no harm to participants, no lack of informed consent, no invasion of privacy and no deception involved (Bryman, 2008). An ethical clearance certificate to conduct

this research has been approved from Cranfield University Research Ethics System (CURES) Review Reference Number (CURES/625/2015) (Appendix A) and the ethics guidelines provided by them were followed. Furthermore, clearance to conduct data from each organisation was been agreed to and approved by them before collecting data (Appendix A).

3.18 Chapter summary

This chapter has outlined the ontological and epistemological approaches adopted as constructivist, and the research methodology selected for this research was grounded theory as well as a participative action research approach with an inductive stance. The advantages and disadvantages of quantitative and qualitative research are discussed with the latter being the choice for this research. The various methodological inquiry modes are also discussed which include, case study, ethnographic research, action research and grounded theory. Grounded theory was selected as the most appropriate inquiry mode for qualitative research, as it is highly recognised for its ability to generate theory from the data (Strauss and Corbin, 1998). Furthermore, Sackmann's approach (1991) is discussed and applied, which combines both issues-focussed and phenomenological focussed research as a highly suitable approach for researching OC. Semi-structured interviews, observations, literature review and focus groups were selected as data gathering methods. The research was conducted and analysed in three phases.

4 Chapter 4: Data gathering and analysis

4.1 Introduction

The aims of this chapter is to present the aspects that affect lean implementation, and following this, aggregate the aspects into higher level of themes with analysis and in addition identify the ideal position for each theme. Finally, the current perception of participants was gauged against the ideal position. A participative approach was adopted in order to work with the SMEs manufacturing sector teams to uncover these aspects. In the first phase, the pilot study was discussed and then from the main study fieldwork, data were collected in six manufacturing companies. Further data were collected by interviews held with 29 interviewees and three focus groups. In addition, the chapter presents an analysis of the data. Phase two presents the development of an instrument to gauge the current perception of participants against the ideal position. The sources of the ideal position comes from literature review and data gathering. In order to achieve this aim, this chapter is organised as presented in Figure 4-1.

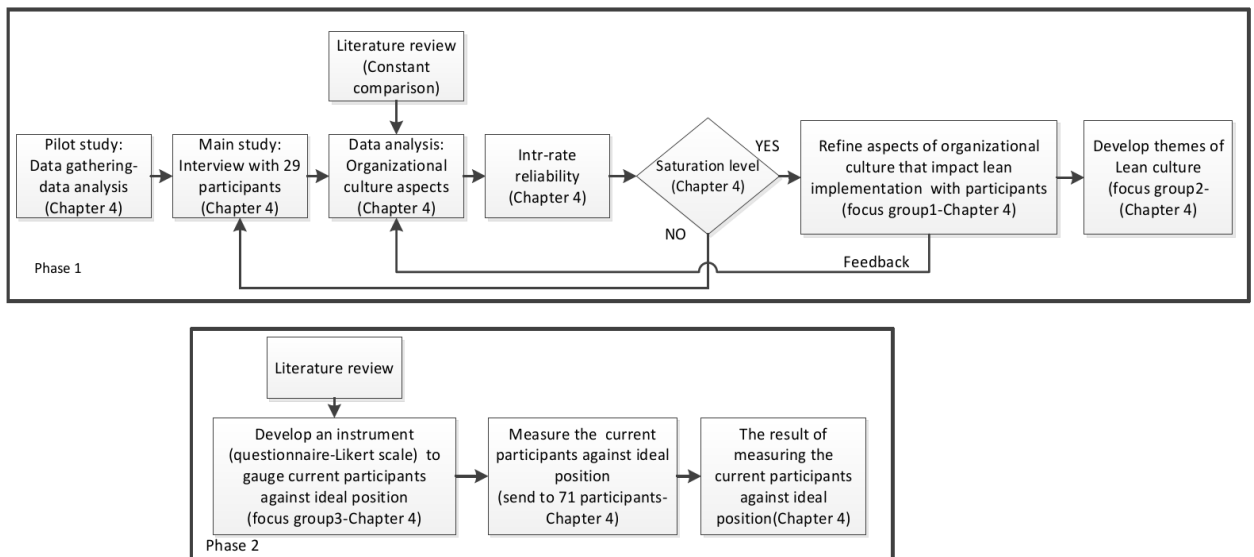


Figure 4-1 structure of chapter 4

4.2 Phase 1: Pilot study

A pilot study is a 'small scale version[s], or trial run[s], done in preparation for the major study' (Hungler et al., 2001, p. 467). The aim of the pilot study was to identify enablers and inhibitors of lean implementation (LI) in Small and Medium-sized Manufacturing Enterprises (SMEs) in Saudi Arabia. The study uses qualitative analysis in order to gain insights into organisational culture. Moreover, the purpose of this is to conduct issue-focused seven semi-structured interviews with the sample group. A grounded theory methodology was selected due to the nature of the research, which involves exploring organisational culture aspects (Alkhoraif and McLaughlin, 2018c). The findings identify the aspects that did not appear in literature review with regards to organisational culture and lean SMEs, thus informing the main research phase. Conducting a pilot study is important to explore and uncover aspects of inhibitors and enablers of lean culture in organisational culture of SMEs that do not appear in prior research (Alkhoraif and McLaughlin, 2018c). The information then influenced the direction of the future interviews to be conducted in the main study (Charmaz, 1995). For the purpose of this paper SMEs refers to organisations with fewer than 250 employees (the definition given by the European Commission; EC, 2011) .

4.2.1 Data sampling

The data sample for the participating companies in this pilot study is provided in Table 4-1 & 4-2. The pilot study was conducted in October 2015 with seven interviews in various companies where lean implementation had been applied but failed. The samples had been selected based on their experiences. The participants varied in terms of their position in the organisations (Alkhoraif and McLaughlin, 2018c). Therefore, the sampling method refers more to events and incidents as opposed to participants (Corbin and Strauss, 1990).

Table 4-1 Organisations sampled in the pilot study (source: by author)

<i>No. of interviewees</i>	<i>Industry</i>	<i>Position</i>	<i>Organization size</i>
4	Steel	Private	Medium
3	Oil	Private	Medium

4.2.2 Data collection

Semi-structured, issue-focused interviews were undertaken for the pilot study. The dates and times were pre-arranged, and the interviews took place at the interviewees' primary place of work. The participants chose the date and time for the interview that would suit them best. According to Kvale (1997), face to face interviews and semi-structured interviews are most effective in providing information-rich responses, thus, adhering to the grounded theory process utilizing an issue-focused approach (Sackmann, 1991). This was an important aspect which was also applied in the main study because all levels of employees are considered important in lean implementation (Angelis *et al.*, 2011). Each of the interviews took between 40 and 70 minutes (Alkhoraif and McLaughlin, 2018c).

There was an initial small talk period to get to know each other and break the ice, allowing the interviewee to feel more relaxed. Open-ended questions were asked that were issue-focused as in accord with Sackmann (1991). Open-ended questions are more likely to prompt the participant to describe their experiences freely. The interviewees were encouraged to share their ideas without any time restrictions. They were also informed that the interviews would be recorded for the purpose of accuracy in the data analysis stage. Grounded theory assigns great importance to the perspectives and meanings prescribed to actions and contexts by the research participants and thus emphasises methodological openness and giving priority to internal validity (Tidjani, 2010). The interviewees were asked to give examples of things that worked well and that did not work well during lean implementation (Alkhoraif and McLaughlin, 2018c).

The questions been asked were issues-focussed in accordance with Sackmann's (1991) approach.

1. Tell me about an example of when you have seen lean implementation work well?
2. Tell me about situation where lean implementation has not worked well?

Table 4-2 Data Sample for Pilot Study (source: by author)

<i>No.</i>	<i>Position</i>	<i>Age</i>	<i>Industry</i>	<i>Interview Length</i>
1	CEO	52	Steel	50 minutes
2	Production Engineer	33	Steel	60 minutes
3	Chief Engineer	41	Steel	65 minutes
4	Mechanical Engineer	35	Steel	45 minutes
5	CEO	60	Oil	55 minutes
6	Production Engineer	39	Oil	60 minutes
7	Worker	30	Oil	70 minutes

4.2.3 Findings

Having conducted the pilot study interviews, the codes were developed, these can be seen in Table 4-3. Table 4-3 provides an overview of organisational culture enablers and inhibitors of lean implementation. Twenty-nine codes were identified and are briefly described. It has been noted in Table 32 is the dominance of family effect, many decision-makers, teamwork, poor communication and external support. On the other hand, some codes get less attention, such as lack of financial investment in continuous improvement. Teamwork is mentioned by all the participants as an important driving factor for organisational culture. However, aggression on the shop floor hardly affects all participants. In general, the findings from the pilot study suggested that family

effect and many decision makers can influence the lean implementation process (Alkhoraif and McLaughlin, 2018c).

Table 4-3 Pilot Study Interview aspects and recurrent aspects (source: by author)

	<i>Participants</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>Total</i>
No	Codes								
1	Poor communication	1				2	1	3	7
2	Procedural activities not clear							2	2
3	Low of health and safety awareness					1	1	1	3
4	Poor inspection quality				1	1	1	1	4
5	Lack of professional training in Lean.			1	1	1	0	2	5
6	A large number of decision makers			1	1	1	2	3	8
7	Family effect			2	3	3	3	4	15
8	Lack of consultation				1	1	1	1	4
9	Lack of financial investment in continuous improvement				1		1		2
10	poor planning					1		1	2
11	Short term focus			1	1	1	1	1	5
12	No reward systems			2	1	1		1	5
13	Promotion non-existent opportunities	1	1	1					3
14	Poor recruitment process	1	1	1					3
15	Lack of organisation tools					1		1	2
16	Request delays					2	1	1	4
17	Lack of knowledge within top management			2	1	1	1		5
18	Multi-tasking						1	3	4
19	No feedback system				1		2	1	4
20	Prioritisation of tasks unclear						1	1	2
21	No performance indicators					1	1		2
22	No contingency planning			1			1	1	3
23	No teamwork			1	1	1	1	1	5
24	No receptivity							4	4
25	No external support	1		2	1	1	1		6
26	Job security					1	1	1	3
27	Geographic movement						1	1	2
28	Openness					1	1	2	4
29	Aggression to the shop floor							2	2

4.2.4 Constant comparison

Having explored all the aspects from the interviews conducted, the next step was to compare all the codes and information to the literature review. The aim of this is to identify existing researched information and new information that has not been identified before (Charmaz, 1995). There is a large volume of

published studies describing the role of lack of consultation, external support from consultation and no professional training (Womack and Jones, 1996; Allen and Meyer, 1997; Shah, 2003; Womack, J., & Jones, 2003; Achanga *et al.*, 2006; Shah and Ward, 2007; Angelis *et al.*, 2011; Panizzolo *et al.*, 2012). The existing literature review on barriers to lean implementation is extensive and focuses particularly on poor communication, teamwork and poor planning (Womack, Jones and Roos, 1990; Crofton and Dale, 1996; Womack and Jones, 1996; Womack, J., & Jones, 2003; Mann, 2009; Angelis *et al.*, 2011; Hu, Mason, Sharon J. Williams, *et al.*, 2015). Over the past decade, most research in lean implementation has emphasised the use of safety and inspection quality (Munene, 1995; Crofton and Dale, 1996; Dixon, 1999). It has been noted that some of the codes get less attention such as no performance indicators and an aggressiveness towards shop floor employees, also affected the process of lean implementation (Swank, 2003; Mann, 2009; Angelis *et al.*, 2011; Al-Najem, Dhakal and Bennett, 2012; Hu, Mason, Sharon J. Williams, *et al.*, 2015).

While comparing each code to the literature review in relation to lean implementation for SMEs and organisational culture, it became apparent that two codes were unique in the pilot study interviews. These two aspects did not appear in the literature review within KSA. These two codes are the issue of 'many decision makers in the company' and 'the family effect'. The code for 'many decision makers' was taken from the following statement in the interview:

Many of the decisions made at the same time from several different departments. For example, the production manager, my supervisor and the stock manager, as well as some of the orders were contradictory at the same time. Also, another example of this is, the production manager asks us to complete a particular implementation of the task and after a little while my supervisor asks us to perform another task while we didn't finish the previous tasks... and that's it.... unbelievable.

The other code, 'the family effect' was:

One of the family members, involved himself throughout the implementation process, and instructed us, while he is not member of the company.... I cannot tell you who is [laughing]

Calabrò and Mussolino (2013) characteristic of many SMEs, there tends to be a strong existence of trust amongst board members that results in a number of informal social processes. Moreover, Table 4-3 shows how these two factors influence the organisation and the number of times it is mentioned. This is believed to influence the level of internationalization and governance of the company (Ramaswamy et al., 2000). It has been identified that SMEs face unique governance issues, as they tend to balance a combination of formal and informal aspects which include non-economic goals pursued by the family as in the case of family businesses (Calabro and Mussolino, 2013). Thus, the informality which appears to be a common characteristic of SMEs impacts organisational practices and processes. Thus, in many ways the pilot study uncovered a couple of organisational cultural aspects common to SMEs that are incongruent to enabling a lean culture.

4.3 Main study of the research

Following the findings from pilot study additional interviews run undertaken to develop large body of knowledge.

4.3.1 Selection of the study

The research scope was based on SMEs in Saudi Arabia within the manufacturing industry. In order to achieve the objectives of this research study, the following SMEs, shown in Table 4-4, which are all in the private sector, were approached to participate in the study. Their respective industries have been mentioned in the table below, which depicts a broad range within the manufacturing sector. It was important for the study to collect a range of manufacturers in various sectors in order to have an even distribution of types of companies so the research was not focussed to heavily in one sector within manufacturing (Strauss and Corbin, 1998). Also, an even distribution of medium

and small companies was important in order to explore their OCs and lean implementation to ensure the perceptions and experiences of small- and medium-size companies are equally reflected in the data. The aim was to collect rich data across a variety of SMEs in the manufacturing sector in order to have a ‘thick’ explanation of what is happening (Strauss and Corbin, 1998).

Table 4-4 SME Data Sample in Saudi Arabia Manufacturing (source: by author)

No.	Industry	Position	Organisation Size
1	Steel manufacturing	Private	Medium
2	Electric manufacturing	Private	Medium
3	Oil manufacturing	Private	Medium
4	Paper manufacturing	Private	Small
5	Packaging manufacturing	Private	Small
6	Construction manufacturing	Private	Small

4.3.2 Data collection

The researcher conducted twenty-nine semi-structured interviews with all companies listed in Table 4-5, where they currently face barriers to lean implementation (Karim *et al.*, 2011) . The sampling was selected based on their experiences. The participants ranged in terms of their position in the organisations. Therefore, the sampling method refers more to events and incidents as opposed to participants (Corbin and Strauss, 1990). Table 4-5 presents the number of interviewees(Alkhoraif and McLaughlin, 2018a).

Table 4-5 Interview with the employees from interviews (source: by author)

No of Interviews	Position	Age	Year started	Interview Length	Industry
1	CEO	52	2009	60 minutes	Steel
2	Production Engineer	44	2011	60 minutes	Steel
3	Chief Engineering	45	1999	65 minutes	Steel
4	Mechanical Engineer	35	2010	55 minutes	Steel
5	worker	43	2005	55 minutes	Steel
6	worker	39	2005	60 minutes	Steel
7	CEO	60	2007	55 minutes	Oil
8	Production Engineer	39	2009	60 minutes	Oil
9	Mechanical Engineer	37	2009	65 minutes	Oil
10	Lab technical	41	2008	55 minutes	Oil
11	worker	39	2007	55 minutes	Oil
12	worker	30	2011	70 minutes	Oil
13	CEO	55	2001	65 minutes	Electric
14	Production Engineer	40	2006	60 minutes	Electric
15	Chief Engineering	40	2001	50 minutes	Electric
16	Electric Engineer	37	2010	40 minutes	Electric
17	CEO	56	1998	40 minutes	Paper
18	Production Engineer	40	2009	55 minutes	Paper
19	worker	41	2009	65 minutes	Paper
20	worker	41	2000	60 minutes	Paper
21	CEO	40	2010	50 minutes	Packaging
22	Production Engineer	37	2009	60 minutes	Packaging
23	worker	44	2005	65 minutes	Packaging
24	worker	29	2012	45 minutes	Packaging
25	CEO	36	2010	65 minutes	Construction
26	Production Engineer	37	2010	60 minutes	Construction
27	worker	33	2009	65 minutes	Construction
28	Mechanical Engineer	35	2011	45 minutes	Construction
29	worker	36	2009	60 minutes	Construction

4.3.3 Uncovering aspects of lean culture

Prearranged interviews were carried out at employees' place of work. In each instance, a private office was provided and the needs of participants were taken into account. According to Kvale (1997), face-to-face interviews and semi-structured interviews are most effective in providing information-rich responses. Thus, adhering to the grounded theory process, an issue-focussed approach was utilised (Sackmann, 1991). The duration of time of the interviews varied between 40 to 70 minutes. The initial small-talk period consisting of icebreakers, allowed participants to feel at ease. Open-ended, issue-focused questions were asked Sackmann (1991). Open-ended questions are more likely to prompt the participant to describe their experiences freely. The interviewees were free to talk as much as they wanted. The interviewees were informed that the

interviews would be recorded for the purpose of accuracy during the data analysis stage(Alkhoraif and McLaughlin, 2018a). The questions that were asked were issue-focused in accord with Sackmann’s (1991) grounded theory approach.

1. Tell me about an example of when you have seen lean implementation work well?
2. Tell me about situation where lean implementation has not worked well?

During the interview, the researcher aimed to elicit participants’ views about the existing OC, and the observations were relayed into the research. The researcher kept a journal of observations, and important events were utilized and recorded as suggested by Coghlan and Brannick (2014). The researcher halted conducting interviews after interview No. 29, due to the fact that there were no further insights and the saturation level was reached (Strauss and Corbin, 2008). Table 4-6 presents the duration of interviews and number of pages of transcription analysed.

Table 4-6 Duration of interview and pages number (source: by author)

Duration of interviews (minutes)	Number of pages of transcription
1,660	819

Having conducted the main study using semi-structured interview transcripts, aspects of organisational culture were 37 aspects developed and refined by focus Group One(Alkhoraif and McLaughlin, 2018a), these can be seen in the Table 4-7.

Table 4-7 Aspects which influences Lean implementation. (source: by author)

Aspects No.	Aspects of Organisational Culture	Participants' representation of aspects
1.	Job description	The detail of job activities not clearly established among working staff. These unclear procedural activities directly lead to confusion regarding the correct steps which need to be taken.
2.	Health and safety awareness	Discusses the methods the health and safety procedures of the organisation. A lack of awareness of health and safety policies within the workplace has led to poor working conditions and increased the risk of health hazards.
3.	Quality inspection	The quality of inspections has not been standardised and hence procedural errors occurred leading to sporadic delays in implementing Lean.
4.	Professional training in Lean	Employees were unaware of the lean philosophy, what it aims to achieve and ultimately how this will be achieved. There is a need to facilitate a professional lean training in terms of workshops/seminars for all staff to realise the advantages and efficiencies of lean processes.
5.	Many decision makers	In the presence of a high number of stakeholders, there is a need to follow protocols. A high number of tenured employees in middle and senior management roles made decisions based on their experience, rather than following a company- wide decision-making policy. This resulted in confusion among several teams and potential errors within the organisation.
6.	Role of Family	The role of family seemed to influence the work process. When family members were not involved in the work process, staff could make organised decisions.
7.	Knowledge share	Decision making by senior management has remained unquestionable and neither has there been a culture of dialogue between management and employees. This resulted in knowledge gap and division among working staff.
8.	Poor Planning	The organisation regularly wasted too much time in dealing with implementation problems which could have been foreseen and eliminated with the use of proper planning and past experiences.
9.	Short-term focus	Senior management focused their efforts on the short-term accomplishments (weeks/months) as opposed to long-term strategic goals. This has a direct implication for sustainable ROI (Return on Investment)
10.	Motivation and Reward system	The organisation does not have rewards-based recognition system to encourage the employees over performance. The presence of such a rewarding culture in the organisation would motivate the employees which directly would enhance their productivity.
11.	Promotional opportunities	Employees are not given the opportunity to be promoted to middle/senior management positions despite their achievements, high performances or even long tenured years of service.
12.	Recruitment process	The employees within the organisation were often unskilled and inexperienced in the work they were recruited for. This required additional training before they could be placed for production.
13.	workshop tools and guidance	The organisation does not provide its employees with organisational tools such as handbooks which can assist in their day to day work procedures and task fulfilments.
14.	Delay of staff requests	Due to the high number of management tiers, it takes a long time before requests can be accepted/rejected
15.	Resistance of change	A behaviour taken by individuals or groups when they observe that a change is happen and perceived as a threatening to them.
16.	Ineffective Multi-tasking	Employees within the organisation are given multiple roles and tasks, which causes confusion and does not allow them to finish their tasks effectively.
17.	Feedback system	Feedback or evaluation systems are non-existent. If these were available, it would enable management to understand problems raised by employees. Employees are unable to understand the impact of decisions made by senior

Aspects No.	Aspects of Organisational Culture	Participants' representation of aspects
		management.
18.	Improper Prioritisation of tasks	The sequence of tasks which needs to be completed is unclear and disorderly. Due to this and other organisational changes employees were unable to achieve the targets set.
19.	Performance indicators	There is no system of recording employee performance, therefore the organisation is unable to understand and comprehend employee productivity.
20.	Contingency planning	The organisation does not have a contingency plan which could guide them in case of an emergency and thus resume operations.
21.	Teamwork and leadership attitude	The different functions within the organisation have their own individual plans, without communicating their plan with other departments, rather than working as an effective team.
22.	Job security	There is no guarantee of job security despite an employee's best efforts.
23.	Aggression to the shop floor	Due to the hierarchical nature of the organisation, senior management are aggressive in directing their lower ranking employees.
24.	Productivity Monitoring	Productivity was not measured other than recorded daily tasks and ability to meet deadlines. The key reason for poor productivity was related to lack of motivation by the employees.
25.	Cooperation and mutual trust between management employees	Lack of reputability such as not taking ownership of tasks and not executing within allocated time prevailed. This led to working inefficiencies. Employees do not feel safe to share their inner beliefs or feelings with senior management as they fear they will receive negative feedback. Senior management are unreceptive to ideas/improvements which have been put forward by junior employees.
26.	Bureaucratic Management style	Management style followed a rigid structure in dealing with employees by not accounting for the personal factors relative to individual employees. Rather, a rigid structure was applied to all working staff regardless of individual circumstances.
27.	Innovation management	The top management has not held any initiatives to develop innovation nor thought to implement any in the road map. This may lead to critical issues for future sustenance.
28.	Loyalty of the staff	Most of the employees displayed no sign of loyalty to the organisations. They were primarily driven by the work and pay system which was mechanical.
29.	Research and development (R and D)	There has been neither support nor interest from the top management in investing into R and D activities that lead to a sustainable future of the organisation. The organisation carried a unidimensional strategy.
30.	Emphasis over Individual Contribution	Focus on individual contribution was seen to be lacking and as a result key factors such as capabilities, learning and development, and productivity were ignored. Supporting the employee to increase the capability of knowledge.
31.	System of decision-making	Design a management system to produce orders and decisions to identify, solve problems and make decisions.
32.	Socialisation of the staff	Many employees lacked social knowledge and inter-personal skills which are required to foster a healthy professional environment. Most of the employees were only concerned with work and pay.
33.	Emotional Intelligence of Managers	How to monitor other people's emotion, thinking and behaviour. It is the ability to recognize and deal with other people's emotion effectively, it is basically putting the self in the shoes of others. Understanding of the context and having awareness of others. Lack of emotional support from managers was prevalent. In order to understand emotions, thought processes and behaviour of staff, it is important for managers to have the ability to recognize and deal with other people effectively.
34.	Workload Pressure	Daily routine of same kind of work along with orders to finish within deadlines from supervisors has resulted in creating additional pressure for the employees. This led to a pileup of stress at work. This could be eased with the help of

Aspects No.	Aspects of Organisational Culture	Participants' representation of aspects
		recreational activities.
35.	Ambiguity of Policies	Reliable information about the performance, governance, value and risks of all information related to the employee
36.	Obligatory work	The environment that prevailed in the organisations was that of an enforceable culture rather than a proactive culture. Instead of constructive criticism and supportive directions, employees were often commanded and reminded of their duties.
37.	Identification of resources	Diagnose and analyse resources required and provide the right information related to work.

4.3.4 Inter-rate reliability result

The researcher has used the inter-rater reliability to validate the aspects. Inter-rater reliability of 0.73 Cohen Kappa and 96% Percentage of Agreement were obtained during analysis (Alkhoraif and McLaughlin, 2018a). The results are shown in Table 4-8.

Table 4-8 Inter-rate reliability result (source: by author)

No	Interview	Rater 1	Rater 2	Kappa	%
1	Interview No. 7	33	31	0.72	94%
2	Interview No. 8	30	29	0.78	97%
3	Interview No. 17	46	45	0.79	98%
4	Interview No. 18	49	49	1.00	100%
5	Interview No. 25	39	38	0.79	97%
6	Interview No. 30	43	42	0.79	98%
7	Interview No. 2	24	23	0.34	96%
8	Interview No. 4	50	48	0.65	96%
9	Interview No. 13	27	25	0.63	93%
10	Interview No. 5	39	38	0.79	97%
11	Interview No. 27	39	38	0.79	97%
12	Interview No. 11	30	28	0.64	93%
	Average			0.73	96%

4.3.5 Emergence of themes influencing Lean culture

It was decided among all the participants to provide additional validation and to hone the factors isolated in the coding construct into a higher level of themes. This consisting of categorising the factors into themes in Focus Group Two. The result of this was a group of thirty-seven lower-level codes (factors), representing the separate factors of organisational culture, clustering into collective themes (higher-level codes). These were representative of the wider range of factors of Lean culture that, together, were seen as important to the implementation of Lean. These gathered themes and core concepts were obtained by an inductive method where the participants constantly redefined their meaning, and so legitimacy, in a co-operative way (Alkhoraif and McLaughlin, 2018a), in a collective manner. The seven themes were:

- Communication and interaction in the organisation
- Organisation's strategy and vision
- Organisation's infrastructure of the workshop
- Quality risk management
- Human resources
- Change management and behaviour patterns
- Sustain continuous improvement

The full list of themes and associated aspects obtained from all interview data is shown in Table 4-9 below (Alkhoraif and McLaughlin, 2018a). Figure 4-2, shows the aggregate of aspects to themes and represent the number of aspects has been repeated by participants.

Table 4-9 Themes developed (source: by author)

Higher level theme	Aspects code	Aspects grouped together into higher level	Participants statements used to describe the higher-level theme
Communication and interaction in the organisation	5 7 14 16 34	Many decision makers Knowledge share Delay of staff's requests Ineffective Workload Pressure	Convoy your message to other personal or a group. Thus, the employees know exactly what is important, who is supposed to do what and when. Communication among the staff climate formal and informal information flows in time for inquiry and reflection use of humour and many other languages.
Organisation's Strategy and vision	8 9 18 35 31 6	Poor Planning Short -term focus Improper Prioritisation of tasks Ambiguity of Policies System of decision-making Role of Family	An essential factor which influences different control system configuration and operational environment change. Identify tactics and roadmap to achieve the mission of the organisation. Generate an objective to align the managerial practices process with their strategies priorities to improve their performance, system of decision making and to applied in the organisation.
Organisation's Infrastructure of the workshop	2 13	Health and safety awareness Workshop tools and guidance	This theme refers to the structure of the organisation around the employee. Easily for employees to move with security around within the confinements of their workplace. Poor infrastructure planning was evident from the layout of the workshop. Ineffective planning resulted in redundant activities and procedures indicating a re-design of workshop layout to complement lean processes.
Quality risk management	3 19 20 29	Quality inspection Performance indicators Contingency planning Research and development (R and D)	A group of business processes, technology capabilities and operation environment to create a collaborative program to identifying mitigating product, quantifying, operational risks that can be impact quality.
Human Recourse	1 10 11 12 22 17	Job description Motivation and reward system Promotional opportunities Recruitment process Job security Feedback system	This them refer to the employees' issues. It is a set of roles related to the employee, describing their duty. Determine the needs of the employee and recruit best employees. Dealing with performance and trouble issues. Pushing the employees to the best in their job.
Change management	21 23	Teamwork and leadership attitude	Approach to transitioning group, team and organisation using tactics

Higher level theme	Aspects code	Aspects grouped together into higher level	Participants statements used to describe the higher-level theme
and behaviour patterns	36 26 15	Aggression to the shop floor Obligatory work Bureaucratic Management Resistance to change	to re-direct the use of organisation system process, resources, organisation environment, the reaction of the employees or any other method in the operation that reshape effectively the organisation.
Sustain continuous improvement	25 28 33 30 27 37 32 4 24	Cooperation and mutual trust between employees. Loyalty of the staff Emotional Intelligence of managers Emphasis on the Individual contribution Innovation management. Identification of resources Socialisation of the staff Professional training in Lean Productivity Monitoring	keep going or to keep up to improve the employee and process performance to be continually monitored. Focusing to increase the capabilities, efficiency and the effectiveness to achieve its objectives. Identify the opportunity for streaming work. Many employees in the top management were aware of the prevailing gap in the organisation at various functions of engagements such as operations, human relations, and productions.

Overall collected pages

100%
A total of 819 pages of transcription

Level of classification – theme

1. Communication & interaction in the organisation	2. Organisation's Strategy and vision	3. Organisation's workshop infrastructure	4. Quality risk management	5. Human Resource	6. Change management and behaviour patterns	7. Sustain continuous improvement
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Level of classification – Aspects

Contribution of overall collected statement in %	1.1	28%	2.1	19%	3.1	23%	4.1	15%	5.1	10%	6.1	23%	7.1	39%
	Many decision makers		Poor Planning		Health & safety awareness		Quality inspection		Motivation and reward system		Teamwork & leadership attitude		Cooperation and mutual trust between employees.	
	1.2	11%	2.2	15%	3.2	13%	4.2	17%	5.2	17%	6.2	6%	7.2	22%
	Knowledge share		Short-term focus		Workshop tools and guidance		Performance indicators		Promotional opportunities		Aggression to the shop floor		Loyalty of the staff	
	1.3	12%	2.3	15%			4.3	14%	5.3	13%	6.3	6%	7.3	2%
	Delay of staff's requests		Improper Prioritisation of tasks				Contingency planning		Recruitment process		Obligatory work		Emotional Intelligence of Managers	
1.3	22%	2.4	13%			4.4	5%	5.4	26%	6.4	12%	7.4	8%	
Ineffective Multi-tasking		Ambiguity of Policies				Research and development (R&D)		Job security		Bureaucratic Management		Emphasis on the Individual Contribution		
1.5	21%	2.5	15%					5.5	22%	6.5	41%	7.5	6%	
Workload Pressure		System of decision-making						Feedback system		Resistance of change		Innovation management.		
		2.6	46%									7.6	25%	
		Role of Family										Identification of resources		
												7.7	19%	
												Socialisation of the staff		
												7.8	30%	
												Professional training in Lean		
												7.9	17%	
												Productivity Monitoring		

Figure 4-2 Overall of themes (source: by author)

4.3.6 Analysis

4.3.6.1 The aspects in relation mentioned and repeated

Table 4-10 exhibits the total number of aspects conducted with the participants during interviews and the number of aspects mentioned and repeated. Table 4-10 have been divided in two categories regarding the participants' positions (management level – operator level). The management level was involved in recruiting, training and supervising staff, ensuring compliance with licensing, hygiene and health and safety legislation/guidelines, planning menus, promoting and marketing the business and rolling the company. The operator level involved as an production operator, also known as a machine operator, uses equipment to assist with manufacturing, packaging, and other steps along a production line, while the exact duties may vary from company to company, a production operator may be expected to handle heavy machinery such as forklifts (Vecchio, 2008).

The total number of aspects that were mentioned by all participants, being the *role of family, resistance to change, co-operation and mutual trust between management and employees* scored the highest, while *emotional involvement of managers* scored the lowest. However, from the data in Figure 4-3, it is apparent that the '*recruitment process*' is a common factor between management level and the operational level. Also, what is interesting about the data is that in the Figure 4-3, the operational level group significantly agrees that the *resistance to change* is a major factor that is reiterated 139 times by the operational level participants. Finally, the most interesting aspect of this figure is that '*socializing of the staff*' is never mentioned by the management level. However, this was echoed 67 times by the operational level. A possible explanation for this might be the hierarchical gap between the management and operational levels; Table 4-10 supports that there is a huge gap between operational level and the management level and this has led to less communication between the two levels.(Alkhoraf and McLaughlin, 2018a).

Table 4-10 The frequency of aspects quoted (source: by author)

No.	Number of Participants interview																																					Total			
	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	26	27	28	29												
	Management Level interview																		Operator Level interview																						
	Aspects																																								
1	0	1	1	0	0	1	1	2	0	0	3	0	0	1	2	5	6	2	4	5	2	1	2	5	3	8	2	1	2											60	
2	0	1	2	1	1	1	1	0	0	1	1	2	0	5	3	2	4	6	5	8	5	8	5	6	4	2	3	5	5	4											78
3	0	1	0	1	1	1	2	0	1	0	1	0	1	2	2	3	2	1	2	3	4	2	3	5	3	5	4	1	2											51	
4	0	0	0	0	0	1	0	1	0	1	0	1	0	5	4	5	6	8	5	6	9	6	8	9	6	8	7	8											103		
5	1	1	1	2	1	3	0	1	1	1	1	10	2	3	3	4	2	3	4	5	2	3	4	5	2	3	2	1	1											96	
6	4	3	4	2	1	2	3	4	5	3	4	5	3	11	2	4	5	6	20	12	8	5	6	4	5	4	5	4	6											157	
7	0	1	0	1	0	0	2	3	0	2	3	0	2	0	4	0	3	2	2	0	0	0	0	2	3	4	4	5	1											39	
8	1	1	2	3	3	4	2	0	0	1	1	2	3	2	3	3	5	3	2	2	2	1	2	1	5	2	5	2	2											65	
9	2	2	1	1	1	1	0	1	2	1	2	1	0	2	1	2	2	5	2	3	1	1	1	1	2	5	2	4	2											51	
10	0	0	0	1	2	1	0	0	0	1	0	0	1	2	1	1	1	2	1	1	2	3	2	3	3	3	1	2	3											34	
11	0	0	0	0	1	1	0	0	0	0	0	0	3	5	2	4	2	6	3	5	1	2	4	5	3	5	3	5	5											57	
12	1	0	1	2	1	1	5	2	1	3	2	2	1	5	1	2	1	5	0	3	0	2	0	1	2	0	1	0	0											45	
13	1	1	1	0	0	2	1	0	1	2	0	2	0	2	5	1	2	3	2	1	2	4	1	2	3	2	2	2	2											44	
14	0	1	1	0	0	0	0	1	2	0	1	0	1	1	1	3	5	2	2	1	2	3	2	2	3	2	3	5	2											43	
15	1	1	1	0	0	0	0	0	0	0	0	0	6	7	16	8	9	8	10	7	12	8	7	11	7	12	11	14											142		
16	1	0	1	1	0	2	6	0	0	2	1	1	1	2	2	3	5	2	3	6	5	4	1	5	8	5	5	4											77		
17	0	1	1	1	1	1	3	2	3	2	2	1	0	2	5	4	5	2	3	4	4	5	4	3	5	3	5	3											76		
18	0	1	2	1	1	1	2	1	0	1	0	1	2	5	3	2	2	4	2	3	4	1	2	3	2	2	1	2											52		
19	0	2	0	0	12	2	1	1	1	0	1	0	1	2	2	3	4	2	4	2	3	2	3	2	2	2	2	1	1											57	
20	1	0	2	1	1	0	0	1	0	1	0	2	3	2	2	1	1	1	1	1	2	2	1	1	2	5	4	8											50		
21	1	5	2	1	1	1	2	3	3	2	2	3	5	2	1	2	3	3	6	3	2	2	1	2	3	5	5	5											79		
22	0	1	0	1	0	4	0	0	2	0	1	0	2	5	4	5	6	5	8	6	3	6	5	7	5	4	5	9											90		
23	0	0	0	1	1	1	0	0	0	0	0	0	0	2	0	0	2	0	2	0	2	0	0	1	0	0	8	3											21		
24	0	1	0	1	0	1	0	0	1	0	0	1	1	5	5	6	5	4	5	2	5	1	5	4	1	5	4	1											60		
25	0	2	3	2	5	2	5	2	2	1	2	1	1	2	3	5	8	6	7	5	8	9	6	8	7	4	14	12											135		
26	0	0	0	1	1	2	0	0	0	0	0	0	1	2	2	2	2	2	3	2	2	3	3	5	5	4	1	4											43		
27	0	1	2	1	1	1	0	1	1	0	1	1	1	2	1	1	0	0	0	0	0	0	0	1	0	1	0	2											21		
28	5	5	4	5	4	1	5	6	6	2	5	3	7	0	1	0	0	0	2	0	0	1	0	0	1	4	2	1											75		
29	0	0	0	0	1	3	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	2	0	0	0	2	3											14		
30	0	0	1	0	0	0	2	0	0	1	0	0	1	0	0	1	0	0	2	0	2	0	1	0	1	1	2	3											27		
31	1	2	1	1	1	1	2	0	1	2	1	1	1	2	2	3	2	2	1	2	3	2	1	2	3	3	2	5											51		
32	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	8	5	4	0	0	1	5	0	5	8	12	15											67		
33	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1											6		
34	0	0	1	1	2	3	2	1	0	1	1	0	0	2	5	2	5	5	6	3	6	5	4	5	4	2	5	2											74		
35	0	0	1	0	1	1	1	0	0	1	1	1	2	3	2	1	2	1	2	2	5	3	2	1	1	2	5	2											44		
36	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	2	0	0	1	0	2	0	1	2	3	2	2	2											21		
37	0	0	1	0	2	0	1	0	1	0	1	0	0	2	3	5	6	5	4	5	2	5	6	5	8	5	9	10											86		
	20	35	32	44	38	54	47	34	32	41	38	46	79	93	103	111	134	122	110	102	117	97	106	142	133	169	145											1763			
	528																																								
	2291																																								



Figure 4-3 The frequency of aspects quoted 2 (source: by author)

4.3.6.2 Comparing themes to literature review

4.3.6.2.1 Theme 1: Communication & interaction in the organisation

A great deal of previous research into lean implementation has focused on communication and interaction within the firms. Communication and interaction within the firms is widely recognized as important element for lean implementation (Achanga *et al.*, 2005, 2006, 2012; AL-Najem *et al.*, 2013). At the start of the lean implementation, it is imperative that the goal, the route and an outline of the study is agreed and communicated between all stakeholders. There needs to be a definite procedure for communication identified for each stage of the process. The specific activities need to have a detailed outline of their actions and who is responsible for each makes up the guidelines for a Lean implementation (Al-shammri, 2007). The quality of the communication among the participants determines the success of a Lean implementation process (Worley and Doolen, 2006; Angelis *et al.*, 2011; Crofton and Dale, 1996; Hu *et al.*, 2015a; Mann, 2009; Womack and Jones, 2003; Womack, Jones and Roos, 1990; Womack and Jones, 1996). The senior management team need to able to communicate the advantages of Lean and how its implementation will occur in relation to each company employee (Mathaisel, 2005). It is necessary to ensure that every employee is committed and engaged in the process and to determine how that process will influence their daily job.

Nordin *et al.* (2012) stresses that unless efficient communication and empowered workers are in place then, regardless of the efficiency of the Lean tools and methods, they won't have any effect. The customary management way of thinking will be converted to a Lean method much simpler if the process is assisted through clear and comprehensive information, the sharing of information transparency, constant educating and continuous examination of the Lean endeavour. It is important to be able to measure the level of exertion and development of the Lean process to ensure long-term success. Nordin *et al.* (2012) explained that the Lean change method needs to be viewed as intentional as Lean is a dynamic process, not a static state. Consequently, a misalignment of business and environment can prove to be the result of a core

failure stemming from poor communication and inadequate base resources. Every employee, regardless of rank, within the company needs to participate in the implementation. As a result, a clear communication process is necessary (Puvanasvaran *et al.*, 2009) and needs to be open, with ease of access to each other, and with a high level of trust involved. There can be no going back once the channels of communication have been opened (Lucey *et al.*, 2004) and those channels need to be constantly monitored to ensure there are no breaks in the flow of information between staff (Turesky and Connell, 2010).

Kalling (2003) found that richness of communication channels facilitates the transfer of best practices across manufacturing plants. Wagner (2003) argues that in partnerships, close relations, co-operation with partners and interactions that stimulate teamwork and communication will enhance the ease of knowledge-sharing processes. Communication has been recognized as playing a critical role in the activities of manufacturing firms and linked effectively with traditional knowledge-intensive sharing processes to enhance the knowledge among the employees (Powell and Snellman, 2004; Powell, Riezebos and Strandhagen, 2013a).

The Lean implementation process will obviously become more complicated if huge numbers of stakeholders and participants are involved. These could include staff across multiple departments, sections and companies (in particular, if the Lean process is centrally managed by a single company). Consequently, Lean implementation usually uses procedures that don't require lots of decision-making across departments or other companies, these procedures minimise difficulties and issues and make communication between the participants easier (Rahbek Gjerdrum Pedersen and Huniche, 2011; Albliwi *et al.*, 2017). Bigger and more technical activities that required a high level of co-ordination between lots of participants and resources were harder to manage and so were often neglected or put on hold, while smaller, consistent improvements were more easily managed and completed without excessive efforts needed (Rahbek Gjerdrum Pedersen and Huniche, 2011).

According to an interviewee 4:

...there are a lot of decision makers that have to be involved in the implementation process, that quit too much and in the same time confusing.

Hines (2010) explains that organisational change can only be achieved through the establishment of a suitable culture. Commonly, companies would have concentrated on boosting their efficiency and production levels, returns and developments, and would have neglected the relevance of employee engagement to the company. Atkinson (2010) describes how change is an emotive, social and political procedure, not a procedural logical one, which would show how change reflects on employees and their motivations. The stresses associated with jobs have increased negative activities and led to an inadequate working environment (O'Donnell and Boyle, 2008). Bicheno and Holweg (2009) describe how the process for change is the real barrier, not the people but Hines (2010) says that this can be solved through effective communication. Bicheno and Holweg (2009) further explain that the change is initiated in the movement stage. Communication is one of the success factors in this stage. Organisations must ensure effective communication channels are in place, as this is vital for ensuring lean is success (Alpenberg and Scarbrough, 2016; Panizzolo et al., 2014).

4.3.6.2.2 Theme 2: The Organisation's Strategy and vision

A large and growing body of literature has investigated how strategy and vision enhance or inhibit lean implementation. This theme is strongly linked to communication, HR, change management and leadership commitment as will explain further ensure lean agility, a company's vision and strategy for change needs to be established (Vermeulen et al., 2014; Womack et al., 1990). This means that processes for improvement that describe and support the process need to be agreed and communicated to increase engagement and input among the participants. This should lead to a successful implementation, satisfied customers and competitive advantages (Vermeulen, Pretorius and Kruger, 2014), will reduce errors, will improve the production process and

reduce waste during this process and will increase flexibility so as to react to changes in the external environment, Strategies and visions identified in the research and competitive priorities in relation to lean implementation were as follows: quality of doing things right and providing error-free goods and services; cost of quality measurements from end-to-end processes; speed of doing 'things' right and fast the first time and keeping delivery promises; flexibility and ability to adapt processes to cope with changes; and cost effectiveness and elimination of waste of resources (Esan et al., 2013b; Hines, 2010; Vermeulen et al, 2014; Womack and Jones, 2005; Wong, Wong and Ali, 2009). One of the participants No:11 state that:

The productivity, quality, efficiency and the innovation is important factors for our organisation to stay in a good position [...] and these needs an alignment strategy to deal with them to block similar mistakes from happening in future.

Several issues and attitudes have been researched and described through various studies and the information gathered has improved the Lean processes and culture. The most important of these, that can both benefit or hinder Lean, are dedicated senior managers, strong leadership, engaged participating employees, well-defined vision and strategies, prioritisation of tasks, system of decision-making, clear policies within the organisation, and communication. The majority of these enablers have been adopted by Toyota (SUGIMORI *et al.*, 1977; Bowen, 1999; Liker, 2004; Takeuchi, Osono and Shimizu, 2008; Marksberry, Badurdeen and Maginnis, 2011; AL-Najem *et al.*, 2013; Radziwill, 2013). Rymaszewska (2014) explained that SMEs usually lack information and experience of Lean implementation, specifically where the SME is a family-run company with an owner covering many roles. Ellington et al. (1996) investigated these family businesses specifically for Lean implementation. He determined that these types of companies are not as inclined to implement total quality management (TQM) because of the quantity of requisites, such as time and money. Also, the structure of a family-run business would normally be a centralised one, but TQM needs a decentralised structure. It was also recognised that procedures for quality and management would be very different

between family businesses and management run businesses. Ward (1988) explained that family businesses usually concentrate on short-term planning, which is against the requirements of Lean that requires long-term goals and plans and additional financing of these.

Ellington et al. (1996) explained how family businesses do not favour change, preferring things to remain as they are. They have a short-term focus. Levinson (2011) agreed that these types of companies challenge change and, although they will make improvements, they do so unenthusiastically. Hofer and Charan (1984) explain how issues arise from how they make their decisions and strategies, due to their centralised structure and that this means that they are not conducive to change or Lean. In addition, their managerial abilities are casual as they have mainly been self-taught through experience. Cooper et al. (2005) contrasted family run and management run businesses in regards their execution of strategies and discovered that family run businesses have much better customer relationships and methods of dealing with customer satisfaction. One of the survey participants No: 3 agreed with this when they said:

After [...] years of being in business after all we have a tendency to perceive the customers' demand [...] I don't believe we'd like to possess vision or strategy or even a survey or a system [...] we are the only organisation that manufacture this piece of product.

SMEs mainly concentrate on planning for operational issues and rarely have a long-term goal or plan. They deal in the short-term and their plans are more instinctive than analytical. They would not demonstrate consistent, logged work. This makes it difficult for SMEs to implement Lean, which is primarily a long-term goal (Ghobadian and Galleary, 1997).

The company's vision and strategy must be communicated to all members to ensure that they all know the plan. This will also guide the participants in their activities and give them goals to achieve. In general, it was identified that companies don't use a specific strategy or employee input when introducing improvement measures or cultural changes (Bhasin and Burcher, 2006; AL-

Najem *et al.*, 2013). Achanga *et al.* (2006) study concentrated on researching Lean implementation and CSFs and the results indicate that strategy and vision are core components of success. Al-Najem (2013) explain that if there is ambiguity between vision and strategy it is usually due to disassociation and distance between senior managers and the employees.

Examination of several SMEs showed that their vision, mission and strategies were not easy to access or find, even though this is vital for participants and stakeholders for their engagement and motivation. Companies need to arrange formal sessions specifically for the communication of the vision, mission and strategy and this should be achieved with the assistance of specialists on the subject (Al-Najem, Dhakal and Bennett, 2012; Al-najem, 2014; Löfving, Säfsten and Winroth, 2014a). Staff are the most important commodity of an organisation and need to be nurtured and included in any plans for that organisation when deciding on an implementation of Lean. An absence of capable employees means that a Lean culture will not endure (Tsang and Antony, 2001).

SMEs usually suffer from a lack of resources, budget and experience with which to education staff in Lean requirements (Antony *et al.*, 2008). SMEs do not have the capacity or capability for quality as these are multiple source activities such as planning, training and leadership. However, Phillips *et al.* (1983) argue that a smaller number of employees is of benefit as they are easier to organise and implement changes quicker and to communicate with. Also, less employees means that it is easier to explain the strategy to them and so there are better chances of creating a culture of improvement and participation. SMEs can also empower employees much more easily than larger companies.

The significance of organisation culture has been recognised by the volume of research carried out on the topic and its importance has been described in terms of success rates for strategies such as Lean implementation (Kaid Al-Swidi and Mahmood, 2011). Strategies and processes such as these require a long-term focus which can only be sustained by a positive sympathetic culture. Liker (2004) identified sub-culture as a possible issue and Womack and Jones (2005) explained that resistance to change was a problem. Bhasin (2012)

classified several issues that could obstruct the implementation of Lean, for example, cost, time, additional management responsibilities, leadership skills, resistance to change, culture, dedication and commitment and knowledge of the Lean implementation process. These are all connected to the strategy and vision. Angelis et al. (2011) highlighted the importance of commitment among employees and senior manager for building a Lean culture.

4.3.6.2.3 Theme 3: The organisation's infrastructure of the workshop

There is a relatively small body of literature that is concerned with infrastructure within the workshop practically in Middle East (Al-najem, 2014). This theme refer to the company environment in which the team operates and influences the team. This is because of the nature of the work involved, which includes working with dangerous materials. There are several concerns regarding this area for any company, including employee safety, reducing the number of accidents and protection of the environment, Mittal et al. (2012) researched the CSFs for the implementation of Lean and TQM in SMEs within the manufacturing industry in India, the findings here suggested that supporting infrastructure and the environment within the firm for cultural change is one of critical factors that enable SMEs to achieve a successful Lean implementation. Boyer (1996). Boyer (1996) detailed four kinds of factors for manufacturing infrastructure: quality managerial leadership; smaller specific teams for problem solving; training; and employee empowerment. Organisational change needs cultural change to succeed and obtain an adaptable and vibrant environment, where all participants engage in resolving issues, adding value and company achievement. (Youssef, 2006). Mefford (2009) explained that developing countries have certain disadvantages due to their lack of experienced, trained workers and managers and a modern infrastructure, including transport.

Moreover, the literature has emphasised the importance of infrastructure of the workshop. Al-Najem (2014) stated that the lack of readiness of infrastructure and workshops was one of the most significant factors affecting lean implementation in the Kuwaiti SMEs manufacturing sector. Also, lack of quality in SMEs manufacturing sector caused by lack in improving infrastructure in the

workshop, health and safety and workshop guidance (such as how to use machines and safety slings and labels) in Middle East region (Al-Zamany et al., 2002; Albliwi et al., 2017; Arshida, 2012; Baidoun, 2004; Ismail Salaheldin, 2009; Karim and Arif-Uz-Zaman, 2013; Karim et al., 2011; Nofal et al., 2005; Al-Sulimani, 1995; Zargun and Al-Ashaab, 2013). This was supported from a participant No 19:

The weather is hot here...no rest area...the mode of worker is bad in midday...with regarding to this the weather could cause fire and there is no structure if happen, safety equipment, who is in charge for that and what we should do..

(Sheridan, 1997) claims that the success of the East Asian economies in SMEs is often due to leadership rather than policies. It is their ability to facilitate the reforms required to stabilise firms, provide living essentials for people, develop infrastructure of workshop and harness technology to create an environment that is suitable for bringing about economic improvements that are attractive to productivity. Juran and Godfrey (1998) shows how, in the past, research into lean implementation and TQM was mainly concerned with incomplete infrastructure in manufacturing industries. One of the participants No:20 stated that

I believe that the managers and especially the leadership...should increase their responsible and knowledge to be more realistic to understand and make a quick action for any emergency... I'm not saying all of them are not good...there is some good policies in the firms...however, it's not applied within the workshop... the safety not applied...the health not exist at all in the area....

Certain countries in the Middle East are very progressive and state of the art with a high standard of employee, infrastructure and good access to international technological advancements. However, this may not always be the situation and some other countries have certain shortcomings, such as poor infrastructure, weak export capabilities and an inability to adapt quickly to technological advancements. In addition, their quality of managers may not be sufficient as this aspect is influenced by local culture and society (Al-Zamany et al. 2002; Zargun and Al-Ashaab, 2013). These issues need to be addressed by

organisations in order to improve safety concerns among employees and, if done correctly, can dramatically improve staff confidence and trust, which can indirectly increase competence and production levels (Al-najem, 2014).

4.3.6.2.4 Theme 4: Quality risk management

This theme is similar to the organisation's infrastructure of the workshop in that it relates to the environment within the organisation. This theme refers to measuring and monitoring the parameters that have direct impact on efficiency in a company in general or separate processes inside it (production, sales, logistics etc.). Davis (1983) and Goel (2006) explain how family run companies concentrate on individual staff members, have a long-term focus and place importance on the management of quality risk and company value. Welsh and Raven (2006) detail how family businesses are very strong at recognising customer needs and fostering relationships with them. These types of business are also highly in tune to their employee needs which increases their staff satisfaction and engagement levels towards quality.

Al-Najem (2013) states that many quality risk management systems have been implemented in (larger) companies in Kuwait, as per the literature, but the processes have not been carried out efficiently or correctly. In SMEs, this change has only been taken up intermittently. Research into quality risk management has shown that there is a scarcity of information regarding Lean implementation, the core factors vital to implementation such as participation, dedication, incentive and inclusion, poor or no communication between senior managers and employees, a shortage of skilled workers, poor technology capabilities and infrastructure, uninterested, uncommitted management and weak leadership (Achanga *et al.*, 2006, 2012; Dahlgaard and Mi Dahlgaard-Park, 2006; Safety and Executive, 2008; Karim *et al.*, 2011; Kaid Al-Swidi and Mahmood, 2011; Alsmadi, Lehaney and Khan, 2012a; Karim and Arif-Uz-Zaman, 2013; Al-najem, 2014; Albliwi *et al.*, 2014a, 2017; Alshahrani and Alsadiq, 2014). These views were reinforced by Jaeger *et al.* (2013) who recognised that quality and managerial procedures were not considered important in the GCC area.

Al-Najem (2013) stresses the importance of measurement tools for determining success rate and progress. This can only be achieved if the staff are educated, engaged and empowered to contribute towards the company's vision, goals and strategy. However, the ideal culture needed for this is absent in most GCC SMEs. Data from several studies suggest that the performance of quality inspection in Middle East was problematic in SMEs manufacturing especially in family business (Karim *et al.*, 2011; Zargun and Al-Ashaab, 2013).

Angelis *et al.* (2011) explain how a Lean implementation is centred around specific principles, one of which is a workforce dedicated to improving quality. The goal of these principles is to reduce waste, maintain consistency, encourage continuous improvements and put procedures in place to monitor those improvements. Much of the responsibility for these is given to the employees and they can participate in activities such as quality testing, carrying out simple maintenance, problem solving and suggesting improvements (Angelis *et al.*, 2011). The commitment of top management are more likely to focus on strategic goals (risk management, financial controls) and delegate the operational issues to the line managers (Achanga *et al.*, 2012; Jayaraman, 2015). Eklund (2003) explained how the manufacture of goods is dependent on the workforce and their ability to produce quality products. This is determined by the processes set up for them and the methods in which they use the equipment available to them. This explains how the employees' behaviour in work is at the heart of company performance and that any changes that need to be implemented to improve performance necessitates an equal level of change in the behaviour of the workforce (Robertson *et al.*, 1993). One of the participants No: 4 stated that:

The company does not have inspectors....

Another participant No: 24 added:

I have never heard of 'quality' word in the company.....we don't have such think like that.... When we are in trouble we leave it for the boss... that's it...

Another participant No:1 added:

generally, the worker not responsible if there is a failure.... It is the company's responsible for not creating risk management department or at least an employee for that job in the site...again the supervisor's job...

Lack of research and development units is a key factor which leading the SMEs manufacturing in Middle East to the risk for their productivity (Youssef, 2006). There is a need to shift focus from reactive to proactive quality risk management, to build agile, transparent and diversified systems (Bhasin, 2012; Bhatia, Lane and Wain, 2013). Watt (2007) has distinguished the following steps in the quality risk management process, which should be taken into account by managers: establishing the SMEs risk strategy; determining the SMEs risk appetite; identification and assessment of risk; and finally, prioritizing and managing risk.

4.3.6.2.5 Theme 5: Human Resources

This property refers to the employees' related issues. Lean implementation comprises organisation-wide lean practices (Mann, 2009; Wilson and Roy, 2009). To be successful, lean implementation for competitive advantage requires organisations to apply lean principles in all organisational functions, especially in human resources (Pakdil and Leonard, 2014). Research clearly shows that, without strategic human resource management, overall lean practices will not work (see for example Agrawal and Graves, 1999; Bamber and Dale, 2000; Longoni et al., 2013; Rothstein, 2004; Workplace, 2005; Yauch and Steudel, 2002). Lean operations can only be performed by trained human operators (Birdi et al., 2008). This supported by one of participate No:1 :

"I have never ever get into a training from a professional organization, will we should have at least short term training..."

This property refers to employee-related issues. Lean implementation comprises organisation-wide lean practices (Mann, 2009; Wilson and Roy, 2009). To be successful, lean implementation for competitive advantage requires organisations to apply lean principles in all organisational functions,

especially in human resources (Pakdil and Leonard, 2014). Research clearly shows that, without strategic human resource management, overall lean practices will not work (see for example, Agrawal and Graves, 1999; Bamber and Dale, 2000; Longoni et al., 2013; Rothstein, 2004; Workplace, 2005; Yauch and Steudel, 2002). Lean operations can only be performed by trained human operators (Birdi et al., 2008). This supported by one of the participants No:15:

I have never ever get into a training from a professional organisation, will we should have at least short term training...

By refusing to invest in the workforce (Das et al., 2000) or using substandard staff for the process (Snee, 2010) will increase the risk of Lean failing. If there is a shortfall in the education and development provided this will also mean problems will be increased (Dean and Snell, 1996). The driving force leaders can become disheartened at the lack of career opportunities (Eckes, G., 2001). A small workforce may be as a direct result of the size of the company (Madu, Kuei and Lin, 1995; Powell, 1995; Taylor and Bogdan, 1998; Das et al., 2000; Taylor and Wright, 2003) but, although a larger state company may have a larger supply of assets and means, they may find it harder to implement change. Their maturity may also be a negative characteristic opposing change (Womack and Jones,(1996). MacDuffie (1995) explained Lean production as a 'package', which included the workforce. People at all levels must be motivated and rewarded to be encouraged to take part in delivering improvement suggestions and ideas (Jeyaraman and Kee Teo, 2010; Panizzolo, Bernardel and Biazzo, 2014).

Beneficial human resources procedures include the recording of knowledge and information, which can then be considered a company asset or competitive advantage (Bessant, 1995; Konczak, 1996; Appelbaum et al., 1999; Way, 2002). An extensive meta-analysis based on the human element in Lean implementation was carried out to examine 308 companies over a 22-year period (Birdi et al., 2008). The results showed that education, team-based activities and empowerment had a direct positive influence on remuneration, but that stand-alone Lean operational processes did not. If knowledge is considered

a company asset and a competitive advantage, then this is because of the workforce themselves, which makes them unique (Lado and Wilson, 1994) and a necessity for that competitive advantage (Wright and McMahan, 1992; Harvey and Denton, 1999; Priem and Butler, 2001; Power and Waddell, 2004). Size is a limiting factor to SMEs and this filters down to affect their quantity of employees, chances for promotion and role description (Dolorems Oreno-Luzon, 1993; Oakes, 1995). Lean needs multi-taskers and this would seem to suit SMEs as they are usually made up of a few employees carrying out several roles (Moreno-Luzon, 1993). Although this is beneficial for the implementation of Lean, it may not be of benefit if those employees are poorly qualified for their roles. Haksever (1996) described some of the SME problems in the context of experience and information held by leaders and management, in addition to simply insufficient workforce numbers. There have been several studies carried out across Australia, Italy, Malaysia and the UK investigating aspects of human resources (Sohal and Egglestone, 1994; Shah and Ward, 2007; Anand and Kodali, 2009; Rose *et al.*, 2011; Nordin *et al.*, 2012; Marodin and Saurin, 2013; Panizzolo, Bernardel and Biazzo, 2014).

Mady (2009) advised that companies in the Middle East required certain changes to succeed at TQM implementation. These changes include a greater level of concentration on customer needs and human resources. Berlec *et al.* (2017) explained that the level of change that the entire company culture and workforce had to implement meant that the human resources needed to be up to the task, specifically in the area of management and leadership. SMEs cannot provide job security, which influences employee recruitment and satisfaction, commitment, and quality and productivity levels (Al-Najem *et al.*, 2013; Aichouni *et al.*, 2014; Ghobadian and Gallear, 1997). SMEs are rarely able to offer any extra bonus system or motivations. Additionally, career opportunities may not be available within an SME, which will negatively influence the quality of employee (Ghobadian and Gallear, 1997). Saudi SMEs face huge challenges with their management of human resources. There is a shortage of qualified, experienced, capable employees and Saudi organisations

rarely organise or offer long-term career opportunities for their staff (Saleh, 2016).

SMEs rarely have any kind of established policy on human resources and employee allegiance is rare. Due to the constant drive for a reduction in costs, Saudi SMEs commonly recruit cheap employees with no qualifications. However, although they are less expensive to hire, the work they produce is of a poorer quality than qualified Saudi citizens (Saleh, 2016).

4.3.6.2.6 Theme 6: Change management and behaviour patterns

Change management schemes that have failed have been well documented. In 2008, IBM carried out a survey called Making Change Work on 15,32 participants. The results showed that only 41% of programmes were considered successful (Jørgensen et al., 2009). Chawla and Kelloway (2004) identified a 40% rate of failing and Decker et al. (2012) found that failure rates were anywhere between 28% and 93%. The reasons for these failures were mainly discovered to be an opposition to change. This led to Lawrence (1970) proposing that the concept of resistance needed to be understood. Change management, or organisational change, is the transfer from the present situation, to another, original situation (Smith, 2005). The literature has stated that an intrinsic characteristic of organisational change is resistance because employees feel the need to cancel out their employers' control and power (Smollan, 2011). Smollan (2011), quoting Hultman (2006) stated that there were two types of resistance: active, where a person was openly disapproving, pointing out errors, playing on another's insecurities and choosing the less flattering facts; and passive, where a person would commit to something but then not do it, stalling and hoarding information. Singh et al. (2012) agreed with these definitions but added aggressive resistance. Smollan (2011) pointed out that employees can resist change towards several levels in the company, for example, against managers, peers and outside participants. He went on to say that even though an employee may accept the overall change programme, they may oppose it on a personal basis. Singh et al. (2012) explained that there were three levels of resistance involved. The first is the organisational level, which is

concerned with authority and disputes, operational alignment and culture. The next is the group level that arises as a result of group standards and reasoning. The third is at the individual level that is a result of ambiguity, anxiety, selective view of the situation and tradition. Chawla and Kelloway (2004) explain how there are two factors to resistance: attitudinal, which is a psychological refusal to change; and behavioural, which is acting in such a way that shows a refusal to back the change. Smollan (2011, quoting Prasad and Prasad, 2000) maintains there are actually four levels to resistance and Chreim (2006) proposes three other signs of resistance Table 4-11.

Table 4-11 Typologies and indicators of resistance (Canning and Found, 2015)

Fourfold typology of resistance (Smollan, 2011)	Indicators of resistance (Chreim, 2006)
Open confrontation	Resigned compliance
Subtle subversion	Avoidance/opposition
Employee withdrawal and disengagement	Ambivalence
Ambiguous accommodation	

Chreim (2006) and Karp and Tveterass Helgo (2009) suggest that a person's prior experiences affects their resisting behaviour. Chreim (2006) explained that researching a person's past could give indications as to how they will behave to future changes and Karp and Tveterass Helgo (2009) will determine how they will react to change based on changes that happened to them in the past. Chawla and Kelloway (2004) propose five issues that could affect change resistance during the implementation of Lean: trust, communication, participation, job security and procedural justice.

A participant No:13 said:

There is a very low believe and trust degree in the firm, it's very challenging to believe and trust even your friends or colleague. Some of

them are close to the top administration and get all the advantages and greater holidays. There is no equal cure for all right here.

Singh et al. (2012) defined four aspects: knowledge; understanding; effect; and performance worries. Bovey and Hede (2001, quoting Kyle, 1993) categorise to aspects to resistance: control, the greater the control, the lower the resistance; and impact, the greater the impact, the greater the resistance. Singh et al. (2012) explain change management as a process of planning, implementing, accomplishing, controlling and managing the change plan at a company and individual level through careful management of barriers.

Levasseur (2010) explains how, to ensure success, change management needs to receive recognition of the connection between the participants of Lean. Jorgensen et al. (2009) explain that change is not just a technical process but that companies need to study their employees, culture and influence and effects of change. This notion of learning from the past validates Chreim's (2006) view of past experiences influencing current decisions.

Pech (2001) refers to 'normative influence', which is where employees are expected to behave in a conventional way instead of carving their own innovative path. Pech explains that companies promote this method of thinking in the mistaken belief that this minimised the intellectual burden on staff, which would make their working day easier. This becomes known as developed pattered thinking, which creates a comfort zone made up of routine meetings and everything performed as standard. This creates a culture of lethargy, resistance to change and biased towards creative thoughts, which can have such a negative impact that any impetus of change or improvement is immediately rejected if it is out of the ordinary (Pech, 2001). Lots of change strategies don't succeed because they fail to recognise the interconnected functions of climate and culture in a company (Sopow, 2006). Hoogervorst et al. (2004) developed on this, saying that lots of change strategies concentrate on the workforce instead of the circumstances that influence behaviour. They argued that change strategies need to amend the internal environment and not focus on the staff. Kotter and Cohen (2002) describes these centralised rigid

procedures as 'systems barriers', and defined them as 'the pecking order, laws and processes that limit employees'. Galpin (1996) explained that change needs to be aligned to culture in order to it to work and that prospective changes need to be put through a 'cultural screen' consisting of ten factors. These are: goals and measures; customs and norms; training; ceremonies and events; management behaviours; rewards and recognitions; communications; physical environment; and organisational structure. Pech (2001) also recognises the connection between culture and resistance to change (non-compliance) and advises that companies need a culture that encourages confidence, where leaders communicate effectively and where making decisions is a decentralised process. Kotter and Cohen (2002) studied the effect of the managers' tasks in change programmes and stated that the largest obstacle to change is management; by not demonstrating their commitment to the change or by not supporting the change efforts, which cuts off support to the staff and fails to support the change and shuts down support to the employees, disempowering them.

In the Middle East, management styles are connected to the person's upbringing or origins and this can cause problems. For example, among the tribal people, a consultative method of management is common (Ali and Al-Shakhis, 1989) but other groups rather an authoritarian method of complete power. This would be very much preferred in Arabic culture (Ali, 1995). Another example of Arabic culture and customs influencing management styles would be if a manager was the elder in their family they would be revered, even if their management skills were not very efficient (Al-Najem et al., 2012). Among SMEs, managers are often tenacious, which is against the needs of Lean as this method requires tractability between managers and staff. Even though SMEs have a fairly flat management structure this does not guarantee flexibility, instead it often leads to the opposite as senior managers or owners are extremely dominant in this type of company (Dolorems Oreno-Luzon, 1993). Additionally, the SME leaders may not be qualified to a high standard and can often lack management knowledge needed to implement quality initiatives (Ghobadian and Galleary, 1997). SMEs have several inherent disadvantages that

are barriers to quality. These include issues with organising, staff perception, senior management and staff development. Black (2007) instructs that change needs to originate from senior management and to be led by effective leadership. He also explains that in order to implement Lean senior managers need to keep their employees informed and involved, trained to solve problems and reduce waste, empowered and appropriately remunerated. Liker (2004) identified subculture as a source of issues and Womack and Jones (2005) recognised that resistance was a problem when undertaking innovative ideas. Bhasin (2012) listed some reasons for obstructing Lean including: price of the implementation; management schedules; supervisory issues; abilities of employees; employee outlook or level of resistance to change; funding; culture; stakeholders; and lack of experience of the Lean method. Toyota focused their efforts on eradicating waste and to boost production efficiency while also valuing their employees (Ohno, (1988). These objectives and policies require a rational leader who communicates with the employees and shares the plan for the company so that they become participants in the strategy. This behaviour generates a strong, positive culture where every participant has an important part to play in the improvement objective (Al-Najem et al., 2012). In the majority of cases where Lean has failed it has been found that culture and managing the change process were to blame (Parks, 2002; Mann, 2014). Also, (Moosa and Sajid, 2010) have highlighted that management types are crucial during implementation. Waldman et al. (1998) explain how problems can occur if there is inequality between the management skills of middle and senior managers because this could lead to shortfall of experienced management at each level (Beer, 2003). This could be as a result of lack of commitment from the line managers to the implementation (Maccoby, 1997) or if they lack knowledge and focus (Womack and Jones, 1996).

A participant No:2 explained:

Outdated management methods are still being used in the company which favour control over everything. Mainly an authoritative style is used with the senior managers sticking to their outdated behaviours of

ordering staff around, forcing through changes from a distance and expecting it just to get done. I think this is an outdated approach and that a lot of changes are needed in terms of change management and updated management methods and systems. Their behaviour is detrimental to the company.

4.3.6.2.7 Theme 7: Sustain continuous improvement

Bhuiyan and Baghel (2005) state that continuous improvement initiatives aim to create a culture of ongoing improvement by including everyone involved. Reports that most of these organisational change efforts fail or do not meet targets (Axelrod, R.H., Axelrod, E., Jacobs, R.W. and Beedon, 2006; Stanleigh, 2008). Constant efforts for improvement tries to create a culture to continue this through total inclusion of all participants (Bhuiyan and Baghel, (2005). Results show that the majority of these change schemes are unsuccessful (Axelrod, R.H., Axelrod, E., Jacobs, R.W. and Beedon, 2006; Stanleigh, 2008) and this demonstrates the importance of identifying why, in particular, with continuous improvement incentives. Angel and Pritchard (2008) have estimated the failure rate for Six Sigma processes at 60% and this high failure rate has been validated by Moosa and Sajid (2010). Bhasin (2012) has said that failure rates among UK companies is approximately 10% for Lean implementation and that TQM also has a high failure rate (Cândido and Santos, 2011) at between 90% and 70% in Europe (Oakland and Tanner, 2007). This high level of failure is a serious issue and it is vital to identify measures to prevent it and to increase the chances of success (Moosa and Sajid, 2010). This high level of failure would also indicate that a huge amount of money is being wasted every year on failed initiatives and doesn't bode well for such projects in the manufacturing industry (McLean, Antony and Dahlgard, 2017). Moosa and Sajid (2010) stress that identifying the reasons that quality initiatives fail needs to be carried out but Mellahi and Sminia (2009) state that failure is largely ignored among researchers. McLean et al. (2017) provided some insight into the issue when he explained that the factors that influence continuous improvement were motivations and opportunities, organisational culture and environment, management leadership, training, staff inclusion and communication. Accepting

and implementing a culture of continuous improvement and waste eradication is needed for Lean implementation to succeed (Bhasin and Burcher, 2006). If, for example, a company did not have empowered staff, it is unlikely that they would be actively included in the improvement process or in suggesting solutions to problems (Pinedo-Cuenca, Gonzalez Olalla and Setijono, 2012). Kochan (2000) explain that the employees are at the core of any new incentives as they create permanency and continuous improvements. A company's employees are the ones whose skills, experience and motivation to improve will drive it to succeed in any continuous improvement goals (Hines, Martins and Beale, 2008; Hines *et al.*, 2011; Bhasin, 2013b). Saurin *et al.* (2011) states that certain measures must be taken for employee engagement, such as increases in their level of independence and responsibilities. Womack *et al.* (1990) advise that Lean should be carried out through consecutive stages. The first to be changing staff perceptions towards quality, then introducing flow in value-added systems, in addition to introducing Lean methods and tools. However, if only some of the tools are introduced, the overall prospect for significant and constant improvement will be missed (Achanga *et al.*, 2006). This shows the importance of considering how complex and challenging it may be to implement Lean and that it is not a once off process but rather a continuous long-term change (Frigo, 2003). Womack *et al.*, (1990) has estimated the time needed to full implement the changes at five years for a medium-sized company. Bhasin, (2013) has explained how a large portion of the drive for changes can fall on line managers, which can make them feel overwhelmed. This could make them loose heart, lose motivation and abandon participation (Cheng, 2008). This level of continuous involvement certainly asks for more from employees but encourages them to be empowered to do so. Employees, however, may simply not have the capacity to take on the additional work for improvement (Hariharan, 2006) or lack the empowerment to achieve anything or may feel threatened by the level of change imposed on them (Kuhnert, 2014).

Turnover of staff may also be a problem as knowledgeable employees may be lost and new recruits lacking the necessary training or experience (Zbaracki, 1998). Gijo (2011) has explained that staff trained in continuous improvement

methods are sought-after among other companies and this makes keeping them an issue. There are huge costs incurred in this level of initial and continuous training (Powell, 1995).

In addition, according to Kuipers and de Witte (2005), the importance placed on continuous improvement creates a need for teams and individuals to constantly develop new levels of responsibility and goals; by engaging the employees in the process the continuous improvement initiatives gain more traction and more allies to fight for success and for moving the organisation towards the planned change.

The continuous improvement process does not work without formal rules, monitoring and management support (Dombrowski and Mielke, 2013). Anand et al. (2009) state that leadership gives the organisation a sense of purpose and sets the continuous improvement goals. In addition, continuous improvement is a key element of lean leadership for two reasons: it undermines the necessity of improving all processes and it imposes new requirements for leaders and employees (Dombrowski and Mielke, 2014a). Also, recognition, rewards, interaction and socialization with the workers from the top management will serve as a booster for participation and continuous improvement (Wong et al., 2009b). Testani and Ramakrishnan (2012) state that, a commitment to continuous improvement means that all employees need to be involved in the lean improvement process, leadership must be creative in keeping them excited about the continuous improvement process and create an environment that is safe for them to make suggestions and take intelligent risks. When employees recognize that leaders are interested in their opinions and they are allowed to put their own ideas into practice and make their job better, then true employee buy-in to the lean transformation takes place (Selvaraju et al., 2012; Testani and Ramakrishnan, 2012). In addition, lean transformation requires clear roles, standards and expectations that every employee knows. The expected behaviours within the organisation need to be clearly defined by lean leaders. It should be clear to all employees that the new lean culture is customer-focused, and that the commitment to continuous improvement is ongoing and the

responsibility of every employee; this will lead to enhancement of the continuous improvement initiatives (Selvaraju et al. 2012; Testani and Ramakrishnan, 2012).

Deming (2000) and Imai (1986) emphasised that the overall performance of the new or current applications and systems must be measured and monitored continuously through various performance measures. Also, the main focus of continuous improvement is management of innovation, as indicated by Brunet and New (2003). Improvement through innovation leads to better utilization of continuous improvement resources of a company and better productivity (Singh and Singh, 2015). Fryer et al. (2007) emphasize that CI is necessary in all sectors and CI is about improving the processes involved.

4.3.6.3 Themes located in Schein's model

Barley (1983) explains that focusing on the symbolic factors of organisational behaviour (legends, emblems, symbols, etc.) ignores the core factors that a culture consists of. Schein's model demonstrates artefacts easily but does not explain or interpret them, also the values are only seen as hopes and dreams. Themes are only versions of features of a Lean culture among the SMEs manufacturing division. They are symbolic of their views and were identified through analysis with the division. To determine the common, core beliefs of a culture is the only way to understand it (Schein, 1992) but habits, beliefs and thoughts and feelings are difficult to comprehend or explain but are still core characteristics (Schein, 1991). This means that illustrating these aspects of Lean culture with Schein's model can only be done with visual displays (artefacts) or as realised values (Schein, 1992). This is shown in Figure 4-4.

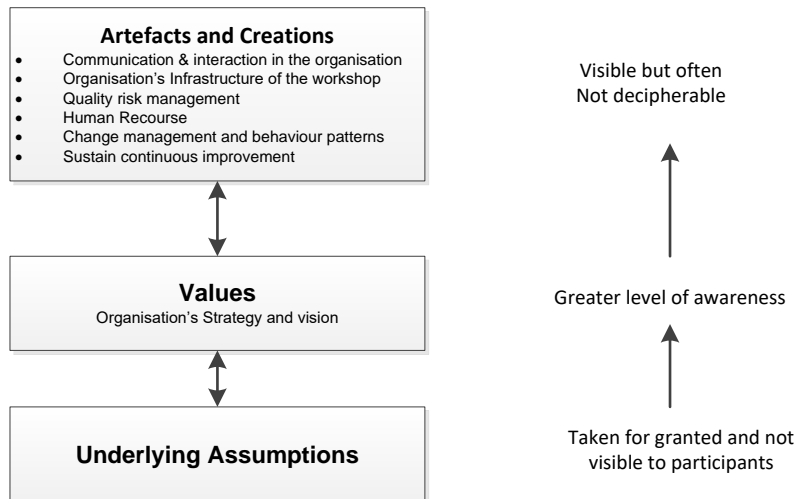


Figure 4-4 Representation of themes in Schein's model

4.3.6.4 Ideal position for themes

The results of analysis were discussed for all themes to jointly review of the ideal position for each theme relevance to the lean culture. The sources of the ideal position were from literature review and data gathering. The following subsection will explain each theme's ideal position. In addition, in Focus Group Three, ideal position has been developed by participants (see Table 32).

4.3.6.4.1 Ideal position from literature review

Communication & interaction in the organisation

Communication and interaction between senior managers and employees is essential and required to ensure that the vision, mission and understanding all the tasks, so that lean manufacturing is attainable (Wong et al., 2009; Timans et al., 2011). They require interpersonal skills such as establishing relationships and interacting with others. Managers should be competent in relationship building and interpersonal communication with people inside their organisation. Furthermore, a managerial role also requires the ability to motivate workers, delegate tasks and manage employee relations, as these are also interpersonal skills (Chandler and Hanks, 1994).

In Toyota, communication is considered the core component of every activity. Its importance is recognised in Toyota, and the organisation has even

established specific methods to encourage communication. These include Labour–Management Councils, Joint Labour–Management Round Table Conferences, and multiple subcommittees in addition to installing an emergency line for the staff in case they need to report issues (Toyota, 2005). Toyota views communication as a core value of its organisation and has fostered a culture generally accepting of failures (Takeuchi et al., 2008, p. 100) and where communication and expression of ideas is easy and encouraged between all departments. Also, Takeuchi et al. (2008) have explained how Toyota has implemented a system for information that can flow from top to bottom staff in the organisation, across functional and seniority levels and among suppliers and customers. It allows employees to comprehend their requirements of their role and avoids problems with other divisions in the company. An example of this would-be communication between the sales team and the production division: sales need to know the capacity of production. This is important information and can prove to be cost and time efficient. (T. Papadopoulou and Özbayrak, 2005; Worley and Doolen, 2006; Sim and Rogers, 2008a; Boyle and Scherrer-Rathje, 2009; Furlan, Vinelli and Dal Pont, 2011; Rose *et al.*, 2011; Nordin *et al.*, 2012).

Organisation's Strategy and vision

Accomplishing, or realising, a company's strategy and vision requires input at both management and organisational levels. This includes issues such as involvement, communication, project management and point of entry (Löfving, Säfsten and Winroth, 2014a). This realisation consists of three of the groups suggested by Platts (1994). Usually, the strategy and vision of an organisation were devised by senior managers (e.g. Platts et al., 1996; Skinner, 1969) but it is well documented now that the best method of surmounting change resistance is the inclusion and participation of employees (Coch and French, 1948; Riis et al., 2006; Slack, 2015). Resource identification is the activity where responsibility and participation are identified (Platts, 1996). (Platts, 1996) highlighted the relevance of group and individual employee inclusion when aiming for commitment, comprehension and commitment. Group inclusion could include activities such as work-shops and brain storming sessions to identify

goals, issues and to put improvements in place (Platts, 1994). The time line is another crucial component (Platts, 1996; Baines et al., 2005) as this establishes the period of time in which the project needs to be completed and so a schedule of initiatives can be planned. The goals and expectancies for the implementation and the process also need to be established (Platts, 1996).

The company needs to include its managers and ensure their commitment for long-term success, improve customer relations, focus on its human resources (training, inclusion, empowerment), communicate, motivate (remuneration and empowerment) and ensure sufficient budgetary ability; HR (practising teamwork and shared vision with employees) and process quality provided by clear organisation strategy and vision (Holland and Light, 1999; Banuelas Coronado and Antony, 2002; Achanga *et al.*, 2006, 2012; Bakås, Givaert and Van Landeghem, 2011; Al-Najem, Dhakal and Bennett, 2012; AL-Najem *et al.*, 2013; Löfving, Säfsten and Winroth, 2014b).

Strategy, vision and competitive nature can be measured against the ability of the organisation to apply any change for mid to long term. In addition, all active projects are aligned with the organisation's strategy and vision. (Pakdil and Leonard, 2015b; Cooper, 1999)

Organisation's Infrastructure of the workshop

Boyer (1996) considered four types of investment in the manufacturing infrastructure that can enhance the infrastructure within the workshop floor: quality leadership on the part of management; the use of small groups or teams for problem solving; training; and worker empowerment. Mittal et al. (2011), considered cultural change and quality improvement supported by infrastructure as CSFs for TQM in the Indian SME manufacturing sector. In addition, the infrastructure within SME workshops provides safety and health guide and allows effective communication channels across all aspects of the organisation (Bhamra et al., 2011; Baidoun, 2004).

Organisational infrastructure, the resources made available to the team and the management style in which the team operates, is required for lean Implementation and deployment (Alsmadi et al., 2012b; Laureani and Antony,

2016; McLaughlin, 2016). K. Dibia et al. (2014) conclude from their case study that management commitment and continuous improvement with supporting manufacturing infrastructure influences successful lean implementation. The research of Soriano-Meier and Forrester (2002) further confirms Boyer (1996) model and finding that 'there is a positive relationship between investment in supporting infrastructure and actual changes towards lean principles and performance' (Soriano-Meier and Forrester, 2002, p. 108). Finally, the industrial relations literature suggests that infrastructure within workshops positively impacts worker health and safety (Longoni *et al.*, 2013). According to Eklund (2000a, p. 464), infrastructure is about work conditions that promote safety, health, well-being and efficiency, and thus focuses on the interactions among people, tasks, workplaces, environments, organisations at work and interfaces rather than on these components.

Quality risk management

Vincent (1997) stressed that all quality risks need to be recognised, investigated, dealt with and watched (Verbano and Turra, 2010; Crema and Verbano, 2015). This system of monitoring and responding can result in quality achievements, even without excessive use of budget and resources with applying feedback systems ultimate purpose and achieved (Jadhav et al., 2015). An example of this is where the manufacturing industry in America has hugely increased production, quality, range of products, adaptability of operations and employee empowerment while reducing product lead times and dangerous working environments (Camuffo et al., 2017; Salem and Zimmer, 2005; Womack et al., 1990). The most significant application of employee empowerment is where any employee can halt production if she or he spots an issue with quality (Salem and Zimmer, 2005).

Lituchy et al. (Waldman *et al.*, 1998) state that the contribution by improvement the quality is the leadership behaviour of middle and top management will be more connected and responsible at all level within the organization, internal resource will delivering training improvements and quality of material delivered (Gijo, 2011; McLean, at el 2017). Eklund (2000) explains that a quality product

for the consumer can only occur if there is a complete quality process involved in its production. This heightened level of stress can actually benefit production levels, quality of the products, expenditures and competitive advantages, ensuring continued viability in the competitive global market (Halling, 2013).

Human Resource

A key component of success in Lean implementation is teamwork and this can be enhanced through staff empowerment and participation. Also, HR initiatives have proven effective for increasing staff capabilities, drive, chances for advancement and to improve operational and social performance when included in the organisation's strategy plan for change (Arnaud and Wasieleski, 2014; Camuffo et al., 2017; Kochan, et al. 1997; MacDuffie and Helper, 1997). Also, abilities, drive and motives are heightened when included in HR management procedures (Womack et al., 1990).

Radeka (2009, p. 357), studying Toyota, explained that HR policies for staff retention build a secure foundation of gathered knowledge for reference. Liker (2004) has describes Toyota's ability to sustain its continuous learning ethos as originating from its desire to understand its employees and to determine their motivations across their organisation.

Henderson and Evans (2000) identified the following CSFs for Six Sigma: management support, organisational infrastructure, training, tools, identified leadership, training and project involvement are linking to the successes of human resources actions (Hahn *et al.*, 1999; Laureani and Antony, 2016a). Chien (2004) applied a human resources management perspective to improving business performance. Chien classified business performance in the dimensions of economy, efficiency, and effectiveness. The results indicated that organisational culture was just one of the factors that influenced business performance. Additional factors included leadership styles and job design, as well as people with the right talents involved in the right place, hiring processes reviewed carefully, people at all levels motivated and rewarded to be encouraged to take part in delivering improvement suggestions and ideas and for people to be multi-skilled; for the latter, they should be offered cross-training

programmes to participate in suggesting ideas to improve processes and the whole system (Jeyaraman and Kee Teo, 2010; Kovacheva, 2010; Panizzolo *et al.*, 2012; Dartey-Baah, 2013b; Zargun and Al-Ashaab, 2013; Alagaraja, 2014; Lorden *et al.*, 2014; Panizzolo, Bernardel and Biazzo, 2014; Nolan and Garavan, 2015; Camuffo, De Stefano and Paolino, 2017).

Change management and behaviour patterns

Organisational change management correlates the staff policies with the company's strategies, technologies and operations (Nordin *et al.*, 2012). Greenan (2003), however, stated that change management was about altering the distribution of control, abilities, knowledge and requirements and that staff attitudes towards change need to be adaptable. The leadership type is mainly focused on the abilities needed to carry out a successful change process (Gupta, Acharya and Patwardhan, 2013; Fok-yew and Ahmad, 2014). Successful implementation of change will increase successful team co-operation, cross-functioning, greater access to knowledge, remuneration of teams, participative management, share and transfer of knowledge, independent leaders and distributed duties (Karlsson and Åhlström, 1996; L. Bamber and Dale, 2000; Lewchuk, Stewart and Yates, 2001; Motwani, 2003; Sun *et al.*, 2006; Worley and Doolen, 2006; Boyle and Scherrer-Rathje, 2009; Nordin *et al.*, 2012). Lathin (2001), Hall (1995) and Lathin and Mitchell (2001) explain that quality incentives can only succeed when organisations initiate change management initiatives aimed at both the organisational and technical components of quality management. Leadership is also crucial for change management and is acknowledged as a core factor for success. Much research has been carried out to validate this (Fok-yew and Ahmad, 2014). Management need to ensure that respect and appreciation is shown to their employees through communication, consideration, recognition, inclusion and participation in the long-term (De Treville and Antonakis, 2006; K. Dibia, Nath Dhakal and Onuh, 2014; Wahjudi *et al.*, 2016). This would go a long way to boost morale and interest among staff and would reduce levels of exclusion (de Treville and Antonakis, 2006). The organisational leaders need to guarantee a long-term commitment for Lean to succeed (Liker, 2004).

Sustain continuous improvement

Toyota encourages every one of its employees to generate ideas. This has created a culture of problem-solving and of thriving in the face of adversity (Radeka, 2009; Takeuchi et al., 2008). Toyota has a culture that can achieve continuous improvement and has made its employees to feel secure, unafraid of failure and able to communicate openly, which is a core value of Toyota (Al-Najem, 2014; Takeuchi et al., 2008). Continuous improvement is achieved through initiating and maintaining improvement initiatives and some skills necessary for this include original thought processes (problem solving, brain storming sessions, fast product or service design), the development of employees, both individually and in a team (cultural assessment and alignment, various flexible working arrangements, mentoring, project-based team abilities), successful leadership (strategic planning, operational planning, policy placement, strategic intercession, strategic procurement, future planning, leadership potential), accessible information and skills (risk management and Six Sigma, Lean methods, project management, supply chain management, strategic procurement, outsourcing, knowledge management) and specialised skills (value stream analysis, process analysis, 5S/visual management, SMED, Jidoka, SPC, DMAIC, Kanban, DFMA, FMEA/FMECA). These are all vital for achieving long-term essential capabilities, competitive advantages and training (Bessant and Caffyn, 1997; Womack, J., & Jones, 2003; Yan-jiang, Lang and Xiao-na, 2006; Fryer, Antony and Douglas, 2007; Singh and Singh, 2012; Albliwi *et al.*, 2014b; K. Dibia, Nath Dhakal and Onuh, 2014; Sanchez and Blanco, 2014; Laureani and Antony, 2016b; McLean, Antony and Dahlgaard, 2017). Summary of the ideal positions in table 4-12 below represent the ideal position for each them.

Table 4-12 Ideal position for literature review and data gathering (source: by author)

Theme	Ideal position from literature review	References	Ideal position from participants
Communication and interaction in the organisation	Communication in the workplace with employees as the backbone for every activity, and communication is highly appreciated, established formal ways in which to promote communication, such as using technology, table conferences, and various subcommittees, as well as establishing a hotline that employees can use to complain if they face problems	Wong et al., 2009; Timans et al., 2011; Chandler and Hanks, 1994; Toyota, 2005; Takeuchi et al., 2008, p. 100; Boyle and Scherrer-Rathje, 2009; Furlan, Vinelli and Dal Pont, 2011; Nordin et al., 2012; Papadopoulou and Özbayrak, 2005; Rose et al., 2011; Sim and Rogers, 2008; Worley and Doolen, 2006	The employees and the managers have a good interaction between them. They communicate with each other to know exactly what is important, who is supposed to do what and when. Communication flows perfectly to fulfil the employee needs.
Organisation's Strategy and vision	Have a management involvement and leadership commitment in order to succeed in its long term journey, 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; HR (practising teamwork and shared vision with employees) and process quality provided by clear organisation strategy and vision	Löfving, Säfsten and Winroth, 2014a; Platts et al., 1996; Skinner, 1969; Platts, 1994; Coch and French, 1948; Riis et al., 2006; Slack, 2015; Achanga et al., 2006d, 2012b; AL-Najem et al., 2013; Al-Najem, Dhakal and Bennett, 2012; Bakås, Givaert and Van Landeghem, 2011; Banuelas Coronado and Antony, 2002; Holland and Light, 1999; Löfving, Säfsten and Winroth, 2014b; Pakdil and Leonard, 2015b; Cooper, 1999	The organisation has a good planning, tactics and road map to achieve the goals of the organisation for a long-term focus. The sequences of the tasks are undertaken in an appropriate way. The policies within the organisation are clear. A good system of decision making exists and is applied in the organisation.
Organisation's Infrastructure of the workshop	The infrastructure within SMEs workshop provide with safety and health guide and allows effective communication channels across all aspects of the organisation, the resources made available to the team and the management style in which the team operate	Boyer ,1996; Mittal et al. 2011; Bhamra et al., 2011; Baidoun, 2004; Alsmadi, et al.2012b; Laureani and Antony, 2016; McLaughlin, 2016; K. Dibia, et al. 2014; Soriano-Meier and Forrester ,2002; Longoni et al., 2013; Eklund ,2000a	The buildings and support areas are appropriate for employees' requirements. The employee functions within his facility effectively. The structure of the organisation around the

Theme	Ideal position from literature review	References	Ideal position from participants
			employee is provided to ensure safety. There is guidance for all equipment. The organisation provides appropriate facilities for employees (rest rooms, room for smoking and a coffee shop, etc.).
Quality risk management	Achieving excellent quality with minimum utilization of resources and cost with applying feedback system is ultimate purpose and achieved, the risks should be identified, analysed, treated and monitored, significant progress in increasing productivity, product quality while lowering product lead times, Increased variety of products, Increased flexibility of manufacturing operations, encourage employees to develop a sense of responsibility for quality and helps to reduce workplace health and safety risks	Vincent, 1997; Crema and Verbano, 2015; Verbano and Turra, 2010; Jadhav et al., 2015; Camuffo, et al, 2017; Salem and Zimmer, 2005; Womack, et al, 1990; Salem and Zimmer, 2005; Waldman et al., 1998; Gijo, 2011; McLean, et al 2017; Halling, 2013; Eklund ,2000	The organisation operates systematically to achieves the goals of the business process, technology capabilities and operation environment in a collaborative way, identifying risks, taking appropriate actions to move or mitigate those risks.
Human Recourse	The employees are well trained to foster improvement and knowledge share. Motivation are provided to encourage people to participate and provide new ideas; worker is highly rewarded for their efforts, Employee empowerment and involvement in lean implantation as the key success factor as the focus is on 'teamwork,	Naor et al., 2008; Al-Najem et al., 2013; Alagaraja, 2014; Camuffo, De Stefano and Paolino, 2017; Dartey-Baah, 2013b; Jeyaraman and Kee Teo,2010; Kovacheva, 2010; Lorden et al., 2014; Nolan and Garavan, 2015; Panizzolo et al., 2012b; Panizzolo, Bernardel and Biazzo, 2014; Zargun and Al-Ashaab, 2013; Hahn et al., 1999; Laureani and Antony, 2016a; Arnaud and Wasielecki, 2014; Camuffo, et al, 2017; Kochan, et al. 1997; MacDuffie and Helper, 1997	The Human Resources department is updated with the employees' needs. The Human Resources department evaluate candidate's capabilities to ensure they can meet business requirements. The Human Resources department manage performance and solve job issues to allow employees to perform effectively.

Theme	Ideal position from literature review	References	Ideal position from participants
<p align="center">Change management and behaviour patterns</p>	<p>The employee attitude towards change are flexible, the leadership style is primarily concern with the capabilities required enact change successfully, ensures the personal property is aligned with the business strategy, technology, and business process of the company, contribute to teamwork building, cross-functional movement, information transparency ,participative management, teamwork rewarding, open communication and information sharing, knowledge learning and sharing, autonomous leadership and decentralised responsibilities</p>	<p>Gupta, Acharya and Patwardhan, 2013; Fok-yew and Ahmad, 2014; Bamber and Dale, 2000b; Boyle and Scherrer-Rathje, 2009; Karlsson and Åhlström, 1996; Lewchuk, Stewart and Yates, 2001; Motwani, 2003; Nordin et al., 2012; Sun et al., 2006; Worley and Doolen, 2006; Lathin, 2001; Hall ,1995 and Lathin and Mitchell ,2001; K. Dibia, Nath Dhakal and Onuh, 2014; De Treville and Antonakis, 2006; Wahjudi et al., 2016; de Treville and Antonakis, 2006</p>	<p>The organisation's management is aware of the change strategy and take appropriate action to ensure the strategy is achieved. Management is flexible with the workflow to allow the employees autonomy in achieving their objectives. Leadership and team spirit are applied within the organisation in a professional way. Respect and self-esteem are shown to all employees.</p>
<p align="center">Sustain continuous improvement</p>	<p>All employees are involved in each task. Top management creative keeping them excited about the tasks in workshop. The employees recognize that leaders are interested in their opinions and they are allowed to put their own ideas into practical and make their jobs better, 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, innovative thinking and developing teams and individuals</p>	<p>Testani and Ramakrishnan, 2012; Albliwi et al., 2014b; Bessant and Caffyn, 1997; Fryer, Antony and Douglas, 2007; K. Dibia, Nath Dhakal and Onuh, 2014; Laureani and Antony, 2016b; McLean, Antony and Dahlgard, 2017; Sanchez and Blanco, 2014; Singh and Singh, 2012; Womack, J., and Jones, 2003; Yan-jiang, Lang and Xiao-na, 2006; Al-najem, 2014; Takeuchi, et al. 2008; Radeka, 2009; Takeuchi et al., 2008</p>	<p>The organisation continuously works to improve the employee and process performance. The organisation focuses on increasing capabilities, efficiency and effectiveness. The organisation continually strives to improve cooperation between various functions such as operations, human relations and productions.</p>

4.3.7 Phase 2: Questionnaire for gauging current perception of participants

The results of analysis were discussed with participants in Focus Groups One and Two, where themes had been developed. In addition, the review of the ideal position for each theme relevance to the lean culture. This drove the study toward joint review of the assessment results and their relevance to lean culture. In order to gauge the lean culture more specifically, an assessment tool based on the themes ideal position in Table 4-12 was anticipatively developed with the participants in Focus Group Three. A Likert scale was used for this questionnaire. Descriptions of what a lean culture would 'look like' and 'feel like' were developed for each of the themes. A series of short statements relating to each of the seven themes were developed with focus group members and literature review to describe an ideal lean culture position, to gauge current perception of participants against ideal positions listed in Table 4-12 for each theme listed in Table 4-9. The participants assessed their perception of lean culture by gauging how close they perceived they were to ideal position of the seven themes, reflecting the ideal position of the Lean culture for manufacturing SMEs (see Appendix). Table 4-9 shows the statements for each theme. A total of 71 responses were returned. All the scores were added together and averaged to produce a group perspective of the participants' position against an ideal position for organisational culture in table 4-13 (Alkhoraif and McLaughlin, 2018a). The results are shown in Table 4-13.

Table 4-13 Organizational Culture assessment scoring result (source: by author)

Theme	Average score
Communication and interaction in the organisation	3.85
Organisation's Strategy and vision	2.98
Organisation's Infrastructure of the workshop	4.22
Quality risk management	4.8
Human Recourse	3.71
Change management and behaviour patterns	2.53
Sustain continuous improvement	2.72

The result indicates the number of issues that were identified, see Figure 4-5. It is noticeable that all the results were in the dissatisfaction area. The lowest scoring theme was *change management and behaviour patterns*, whereas *quality risk management* was the highest theme. What stands out in this figure is the *organisation's strategy and vision*, *change management behaviour patterns* and *sustain continuous improvement* were close to each other on the scoring sheet. In summary, these results show the current state of the ideal position for the firms regarding lean implementation from the participant's perspective (Alkhoraif and McLaughlin, 2018a).

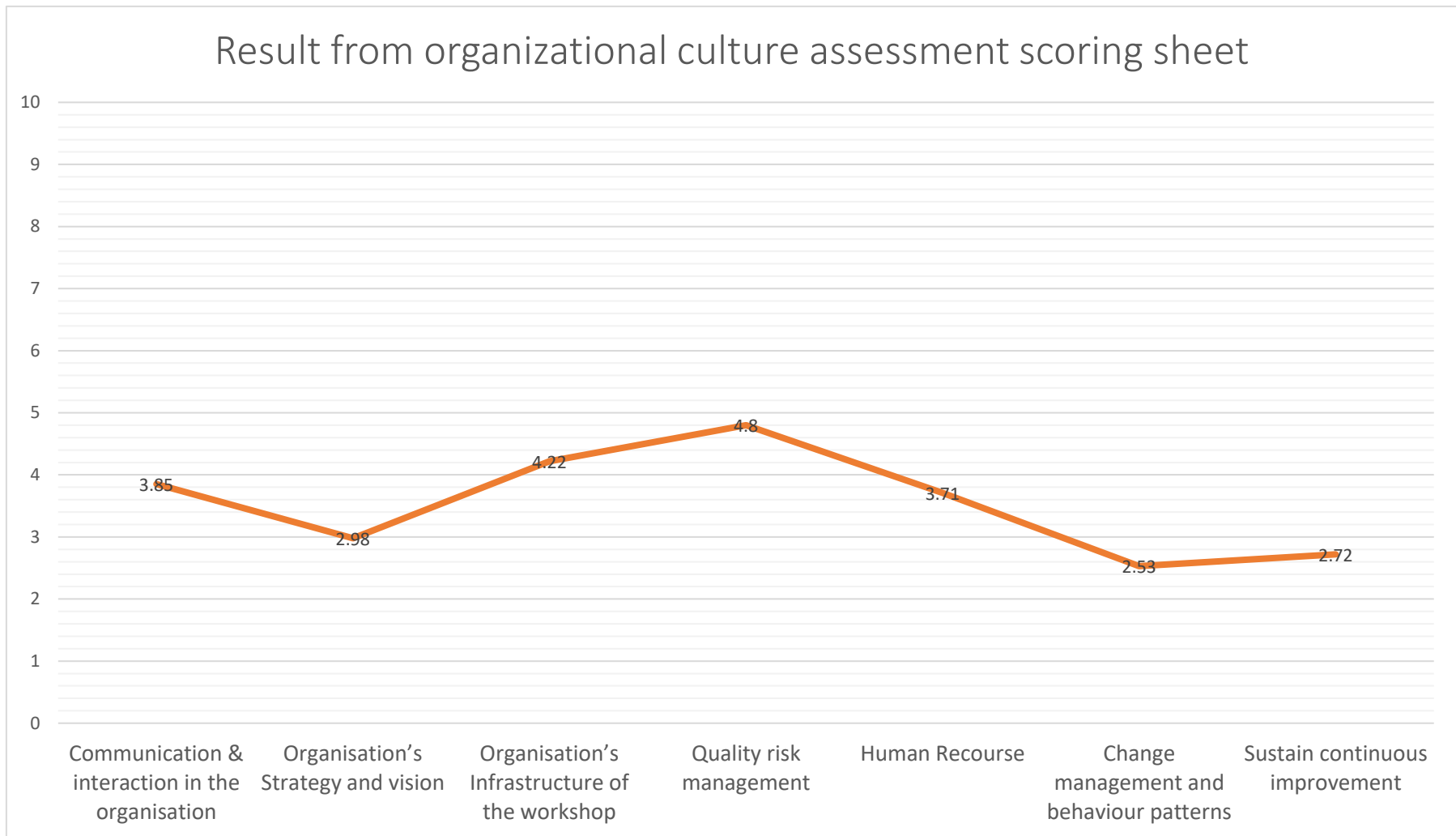


Figure 4-5 Result from Organizational Culture assessment scoring sheet (source: by author)

4.4 Chapter summary

The main purpose of the pilot study was to uncover the areas which enable and inhibit lean implementation that have not yet been identified in prior research by use of the literature review. In order to do this, a sample of two organisations were selected each being in the oil and steel industry and from medium-sized organisations. Among these a total of seven interviews were conducted with employees of all levels from CEOs to factory workers because all employees are considered equally important to lean implementation. Thus, it is important that this is also reflected in the pilot study (Alkhoraif and McLaughlin, 2018c).

The interviews were conducted with an issue-focussed approach in accordance with Sackmann (1991). The interviews were analysed with NVivo qualitative data analysis software in order to help identify complex patterns within the interview results. The interviews were also analysed by reading line by line and creating codes from each of the comments made. Many of the aspects brought up in the interviews correlated with the data from the literature review (Charmaz, 1995). Moreover, the family effect is also unsurprising in the case of SMEs as lines of formal responsibilities become blurred in family companies (Ramaswamy et al., 2000). Furthermore, these aspects are also especially relevant and characteristic of SMEs (Calabro and Mussolino, 2013). Thus, this highlights the main research, which suggests exploring further in order to develop a framework for creating an organisational culture that encourages the success of lean implementation amongst SMEs in Saudi Arabia (Alkhoraif and McLaughlin, 2018c).

In conclusion, the chapter aims to identify aspects of lean implementation in SMEs in KSA. It proposes aspects of social transformation process and how the aspects are affected by OC. The paper opted for an exploratory study using semi-structure interviews, focus groups and observation approaches of grounded theory and action research using twenty-nine in-depth interviews with employees ranging in terms of their position in the organisations, having mainly an experience of the LI background. The data were complemented by context analysis, including simultaneous and concurrent data collection and constant

comparison methods. The paper provided empirical insights about how change is brought about during implementing lean processes. Thirty-seven aspects were identified from semi-structured interviews. All these aspects were aggregated through focus groups into seven main themes. This chapter fulfils an identified need to study how the OC affects lean implementation. It contributes to the current state of lean implementation in manufacturing companies by gauging the current perception of participants against ideal position, in which the results show that all the results were in the dissatisfaction area (Alkhoraif and McLaughlin, 2018a).

5 Chapter 5: Construction of framework development

5.1 Introduction

This chapter focuses on developing a framework of suitable interventions to facilitate lean culture. A series of interventions was developed with participants in focus group Four. A literature search identified interventions relevant to developing lean culture, and the selection of interventions was based on enhancing the theme and reaching the ideal positions in Table 4-12. This provided examples of interventions used, how they were implemented and their perceived influence on changing to a lean culture. Interventions in the context of this research refer to specific actions that have been or could be applied to a group with the objective of facilitating aspects of lean culture. Evaluation of these interventions permitted a framework for SMEs to be developed. A plan of linked interventions designed to develop aspects of lean culture forms the output of Phase Three. The planned interventions for SMEs should take place together as a series of interlinked interventions. The interventions come from two sources, the literature review and data gathering. The interventions address the gap between the current situation and the ideal position of the emerged themes (McLaughlin P, 2006). To achieve this aim, this process is organised as presented in Phase Three of developing framework shown in Figure 5-1.

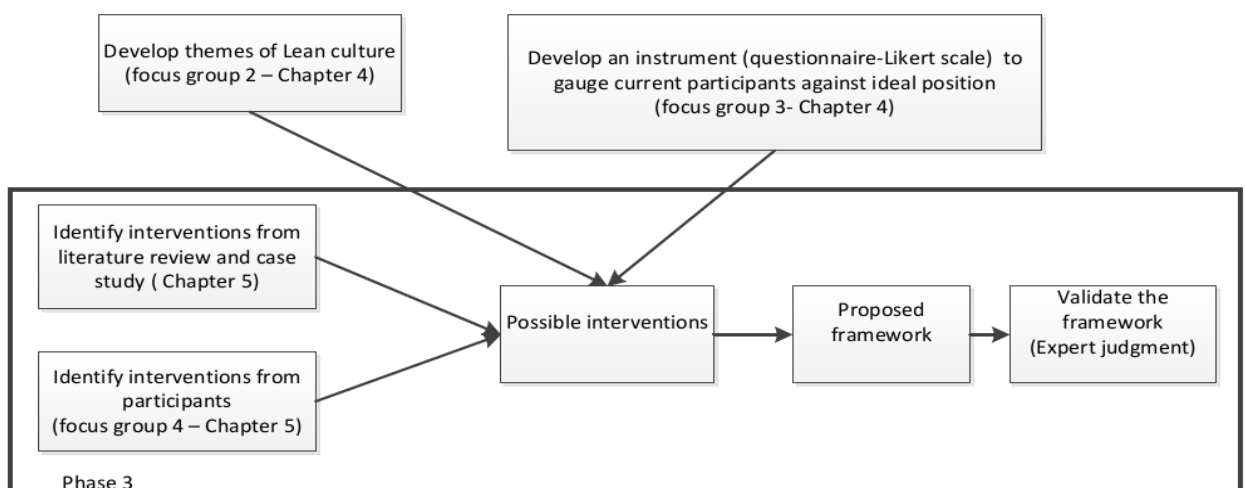


Figure 5-1 Phase three (source: by author)

5.2 Phase 3: Interventions developed from data gathering

A procedure was established to evaluate the results of Focus Group Three with the role of the participants as advocates for ideas for Lean culture. The assessment results from gauging current perceptions of participants indicated extremely low scores on change management and behaviour patterns and sustaining continuous improvement, and low scores on the other dimensions. The assessment against the ideal position for lean culture indicated generally low scores across all the themes. This assessment was used to determine the issues linked to these results and to improve the Lean implementation. A brainstorming session was held to obtain the participants' suggestions for fostering a Lean culture. These suggestions were debated and refined so produce actual suggestions and plans for implementing such a culture. The session resulted in a list of interventions that were deemed acceptable and achievable for the teams and managers and suitable for creating a Lean culture.

1. *Implement using new technology communication*

This intervention allows fast ways of communication by applying internal communication systems. The participants agreed that this would enhance the communication and the interaction between employees within the organisation.

This relationship was identified when a participant No:1 said:

I am not confident; in order to increase the productivity, the organisation should have to implement database system. Otherwise, it is very difficult for us to memorise the knowledge or save it or even to share it.

Another participant No:3 added:

using the last technology or database system is the right stage for setting up measurement goal and metric to enhance the strategy of the organisation.

2. *Weekly meetings*

Project presentations, where project managers actively collect experiences and present them to the rest of the organisation to increase their skills, could be

provided via weekly meetings. Meeting and project display would be packaged in a way that helps workers learn about facilitates lean and tasks. In order to show that managements' helps these activities, so these activities do not increase the cost of their current projects. One of the participants No:5 stated that:

Meeting is the most important element to increase the skills and exchange the experience...

Another participant No:3 added:

Processes like weekly meeting should apply formally in order to have clear communication and discuss any issue related to the environment of the work.

Another participant No:8 added:

Meetings are one of the tools that increase the productivity and the sustainability in the journey...

Another participant No:8 stated that:

The weekly meetings that should organise help us to communicate regularly with each other; we present issues, problems and achievements which accordingly enhances working together.

From the participants' perspectives, weekly meetings between leadership and the employees would enhance the communication and sustain continuous improvement.

3. Managing family influences

"Implement a process where family influences are excluded from decision making by conducting a review board to keep family members from interfering with the whole organisation process, where the board could be from member of the company such as a manager or worker."

This interventions were mentioned and agreed by all their member within focus group. This will lead to enhance the capabilities of the employees' trust in their

skills, and in addition, add individual responsibilities in their duties. Also, develop the ability to create team among the employees, moving the firm to be more agile and successful in term of managing the firms. Not surprisingly, all the participants agreed with the statement that managing family influences will move the organisation to improve the lean implementation journey. In addition, it will enhance all the themes that were identified during the research process without any exceptions.

4. Manage, engage and involve talented employees

When formulating a new strategy, planning and implementation can change. The top management devises a system for talent management and leadership in the organisation by applying three steps: first, coaching attempts to improve an individual's ability to set and meet goal, lead change, improve interpersonal relations, handle conflict or addressing style issues; Second, career planning and development to address different professional needs and concerns as members progress through their work lives; finally, management and leadership development processes that attempt to transfer knowledge and skills to many individuals. They can include in-house training programs, external educational opportunities, action-learning projects, and other activities. Participants can provide a diversity of information and ideas by managing the talent of people. This is supported by one of the participants No:6, who stated that:

Taking care of talent people by providing training program, it will enhance our capabilities, and it will impact our job in positive way...don't forget that engage them and involve them in a decision making is an essential part

In addition, another participant No:5 added that:

Lack of a proper training causes a conflict in terms of solving a problem and not care of talent people what will lead to the same thing...In my opinion training is an essential part as much as looking for the talent people

5. Document a master plan

A high-level plan that states the strategic vision, the milestone action items, their anticipated dates of completion, and lists the people who are charged with the responsibility for completion should be created. This document becomes the 'master plan' for the steering committee during the entire implementation project. The master plan must be reviewed and updated at each meeting held by the steering committee. It is the responsibility of the steering committee coordinator to provide communication from the implementation teams when changes to the master plan are required. Modifications to the master plan must be agreed to by the members of the steering committee. The steering committee coordinator must also communicate changes in the master plan to the implementation teams. This intervention will enhance the organisational strategy and vision, quality and risk management and sustain continuous improvement as participants agreed.

6. Apply feedback system

A system to apply feedback must be presented to organisation members in a form that is readily interpreted. Data should be fed back to members as quickly as possible after being collected and analysed. This will help ensure that the information is still valid and is linked to members' motivations to examine it. Feedback to practitioners and organisation members should be given about the progress and impact of capabilities. Such information may suggest the need for further diagnosis and modification of the change program, health and safety, or it may show that the change programs are successful and only need a process of maintenance. Systems such as survey feedback by use of a questionnaire or survey and feedback meetings should be built that provide an opportunity to work with the data. At each meeting, members discuss and interpret their data,

diagnose problem areas, and develop action plans. As one of the participants No:6 stated:

There are many systems have been changed in the organisation expect there is no feedback system.

In addition, another participant No:4 stated:

Competition puts more pressure on the company and the employees in terms of producing products in a shorter amount of time with high quality and less expense. So, implementing new system such as feedback that can introduce to compete and be a strong competitor.

The participants agreed that a feedback system would enhance organisational infrastructure of the workshop, quality and risk management, HR and change management and behaviour patterns.

7. Motivate by promotion and reward systems

Motivation by promotion and reward systems for individual workers and the team should also be implemented. This intervention contains the design of organisational rewards to improve employee performance and satisfaction. It includes innovative approaches to pay, promotions, fringe benefits and to maintain high levels of desired behaviours. As one of the participants No:7 stated:

Most of the operation problems, what we see is coming from how the company treating their employees, it's obviously that motivate the people who works with you, will work from his heart without any doubt.

Another one of the participants No:1 stated:

People are working really hard and they deserve a reward for that...

In addition, another participant No:6 added:

HR are responsible to reward the employee for their excellent work and from top management as well.

8. Visit other manufacturing firms

Visits to other manufacturing firm can be an external source for lean implementation process for ideas and would provide source of sustain lean implementation for best practices. Visits to external sources and circulating people and ideas encourages the transfer of knowledge. In addition, external sources of knowledge facilitate the lean implementation process. All of the interventions suggested by participants are summarized in Table 5-1.

Table 5-1 Interventions suggested by participants (source: by author)

No.	Interventions	Theme
1.	Implement using new technology communication mechanism to allows fast way communication by applying internal communication system.	<ul style="list-style-type: none"> • Communication and interaction
2.	<i>Weekly meeting: project presentation</i> , where project managers actively collect experiences and present them to the rest of the organisation.	<ul style="list-style-type: none"> • Communication and interaction • Sustain continuous improvement
3.	Managing family influences, implement a process where family influences are excluded from decision making by conducting a review board to separate family member's Interfering within the whole organisation process, where the board could be from member of the company such as manager or workflow.	<ul style="list-style-type: none"> • Communication and interaction • Organisational strategy and vision • Organisational infrastructure of the workshop • Quality and risk management • HR • Change management and behaviour Patten • Sustain continuous improvement
4.	Manage, engage and involve talented people of employee when formulating a new strategy, planning and implementation change.	<ul style="list-style-type: none"> • Organisational strategy and vision • HR • Sustain continuous improvement
5.	Document master plan: A high-level plan that states the strategic vision, the milestone action items, their anticipated dates of completion, and lists the person charged with the responsibility for completion should be created.	<ul style="list-style-type: none"> • Organisational strategy and vision • Quality and risk management • Sustain continuous improvement
6.	Apply Feedback system and must be presented to organisation members in a form that is readily interpreted. Data should be fed back to members as quickly as possible after being collected and analysed.	<ul style="list-style-type: none"> • Organisational infrastructure of the workshop • Quality and risk management • HR • Change management and behaviour Patten

No.	Interventions	Theme
7.	Motivate by promotion and reward systems. For individual workers and the team.	<ul style="list-style-type: none"> • HR • Change management and behaviour Patten
8.	Visits other manufacturing firm as an external source for lean implementation process for ideas, would provide source of sustain lean implementation for best practices.	<ul style="list-style-type: none"> • Sustain continuous improvement

Following sub-sections, development of these suggested interventions, interventions from literature and empirical examples of interventions used to facilitate Lean culture were examined.

5.3 Interventions developed from literature review

The literature was examined for empirical examples of interventions made to improve lean implementation capabilities in organisations using the criteria of action and subsequent outcomes that was made to improve implementation of Lean or discontinuous Lean culture capability. Examination of the literature discussed in following sections suggested a number of interventions.

1. *Knowledge-share management system.*

Knowledge-share management intervention is a significant influence on the propensity of an organisation towards lean implementation within SMEs (AL-Najem *et al.*, 2013). In addition, organisational culture is the most prominent enabler in enhancing knowledge management in transnational projects (Cheung, Wong and Wu, 2011). This intervention moves the organisation beyond solving existing problems so as to become capable of continuous improvement (Cummings and Worley, 2014). The manufacturing organisations must prepare for implementing and sustain improvement and their competencies coverage by implementing an appropriate knowledge management system (Singh and Singh, 2012). Then, knowledge-share management can support standardization and continuous improvement. Fuelled by innovations in information technology, knowledge-share management interventions have focused heavily on codifying organisation knowledge so they can be readily accessed and applied to organisational tasks. This intervention

develops the communication among the employees and at the same time creates strong communication of a strong corporate vision and culture (Cummings and Worley, 2014). Such interventions can include face-to-face communications, which lead to transfer of knowledge, information sharing, which enhances equality in the team and also prepares a basic moves toward continuous improvement by having daily small meeting, good knowledge sharing, etc. (Holmdahl, 2010).

The above examples show that knowledge-share management systems set as a condition for sharing their personal experience, data and knowledge, thus effecting lean implementation and creating lean culture. However, resource convenience is an important factor in a company as it can determine the amount and quality of energies that need to be used on knowledge sharing management. Any barrier to this among SMEs is usually caused by resources. SMEs are not smaller large organisations (Yew Wong, 2005). They usually have a resources shortfall (Welsh et al., 1981; Lee, 1995; Motwani et al., 1998; Murphy, 2002; Jun and Cai, 2003), for example, time, finances and employees, which sets them apart from the bigger organisations. This lack of necessary resources need to be taken into account when applying knowledge sharing management among SMEs.

This was not an issue that received much coverage in the research analysed. Holsapple and Joshi (2000) were the only researchers who gave it a detailed analysis. No-one mentions that employees need training before beginning a knowledge sharing management programme. Larger organisations would have a long history of collecting and cataloguing their knowledge assets through knowledge sharing management and would have the process finely tuned. SMEs would have no such system in place. Jeffcoate et al. (2000) found that SMEs would have very little technological experience or knowledge. Lim and Klobas (2000) state that SMEs would have no knowledge of KM processes. This would seem to mean that SMEs would have more of a need to give relevant training for knowledge sharing management to their staff (Yew Wong, 2005). Knowledge management is a means of recognising, collecting and using

the knowledge in a company for competitive advantage (Von Krogh, 1998). (DeLong, 1997) described knowledge as the data and personal experiences that increase the ability to act. Knowledge management intervention is concerned with how an organisation's knowledge can be stored, categorised and accessed to enhance performance. Knowledge management intervention concentrate on the methods and tools that a company can use to gather, sort and disperse data into relevant knowledge (Cummings and Worley, 2014). Knowledge management is a useful tool for tactical revitalisation and can help companies to gather and use knowledge faster and more efficiently than the competitors, thus ensuring a competitive advantage (Argote, 2013). Also, if knowledge can be applied to generate innovative services and products this can be a source of competitive advantage and increased revenue for companies. Types of knowledge can include company processes, products, consumers and competitors. This information can be in hardcopy format, for example, manuals, guides or databases, or it may be the abilities, experiences and perceptions of employees (Nonaka and Takeuchi, 1996; Dombrowski, Mielke and Engel, 2012). The benefits of knowledge management are becoming more widely known and it is becoming more common among organisations. There is no standard method for it but methods include stages for making, identifying, sorting, categorising and dispersing knowledge in companies (Cummings and Worley, 2014).

There are many IT applications that have been written specifically for knowledge management. Luan and Serban (2002) have categorised these into groups: business acumen, knowledge base, teamwork, subject and document management, portals, customer relationship management, data mining, workflow, search, and e-learning. Issues to consider when designing a knowledge management programme are ease of usability of the technology, does it meet the users' needs, content relevance, and consistency of the knowledge system (Yew Wong, 2005). These knowledge systems are supposed to assist companies to foster and use knowledge to adapt and better themselves.

2. Health and safety

Successful implementation of Lean need not be a negative restrictive process (Longoni et al., 2013). Instead it is an optimum method of improving operations and the health and safety of employees. Companies need to introduce a beneficial environment for their staff that meets their physical and mental needs and abilities and this needs to be as standard in every place of work (Johansson and Abrahamsson L, 2007). The workplace needs to be designed with the best interests of the employees in mind in order to increase productivity. Health and safety measures include Five S, Six S, Poka Yoke (mistake proofing) for safety, visual management, uniform work, ergonomic workstation, the company's infrastructure and total productive maintenance (TPM) (Jadhav et al., 2015). Quality risk management is one of the factor that is affected by absence of a health and safety climate (Vincent, 1997; Verbano and Turra, 2010; Crema and Verbano, 2015). Zohar (1980) uses the term health and safety climate to describe a construct that captures employees' perceptions of the role of safety within the organisation. Given the origins of the generic terms organisational culture and organisational climate (Schneider,1990), it appeared that safety climate was the more appropriate description of the construct that it aimed to capture. This will lead a combined expert teamwork approach to identify, define and solve the shop-floor problems and help to create a safety climate (Jadhav et al., 2015).

In order to increase health and safety climate, three steps should be implemented within the organisation (Alli, 2008). First, a policy for health and safety climate should be implemented; in this guidance, 'policy' means the general intentions, approach and objectives – i.e. vision – of an organisation and the criteria and principles upon which it bases its actions. These form the basis for managing health and safety which shape the written statement of policy required. Second, A health and safety climate should be implemented and organised. Organising means the process of designing and establishing these responsibilities and relationships (Cooper, 2000; Asad Sadi and Al-Dubaisi, 2008; Safety and Executive, 2008; Graban, 2011; Camuffo, De Stefano

and Paolino, 2017). Finally, the health and safety climate should be audited and reviewed. Auditing is the structured process of collecting independent information on the efficiency, effectiveness and reliability of the total health and safety management system and drawing up plans for corrective action (Cooper, 2000; Hsa, 2006; Safe Work Australia, 2013; Camuffo, De Stefano and Paolino, 2017).

3. Recruitment and selection

Recruitment and selection are methods of identifying and getting prospective applicants from various sources so that employers can choose the best of these applicants to fill roles in their organisation (Su and Yang, 2015). They are the most crucial HR management procedures that can affect Lean implementation (Yang, 2006). An organisational culture with common main values are vital to the success of Lean (Su and Yang, 2015). Recruitment and selection are two of the most important human resource management processes with the greatest influence on lean implementation (Yang, 2006). A strong organisational culture with shared core values can be identified as being of importance for a successful lean implementation (Su and Yang, 2015). Organisations can act to achieve shared values among co-workers. In order to achieve that, selecting people who possess the desired values in the first place and socialising employees once hired are two major selection strategies towards TQM (Ingelsson, Eriksson, and Lilja, 2012). There are certain activities the companies can carry out to share the values among staff. These include hiring workers who demonstrate the required values themselves and generating team-based activities to foster unity among the recruits and existing staff. Successful recruitment is vital as this is how knowledge and abilities are introduced into the company (Yew Wong, 2005). Companies need to recruit applicants with the relevant knowledge and skill sets and who are predisposed to sharing their knowledge skills. Robertson and Hammersley (2000) point out that the company's recruiters need to ensure a cultural fit, not just an ability to do a particular job (Yew Wong, 2005). (Yew Wong, 2005) explained employee development as a means of progressing and increasing each employee's value.

The abilities and proficiencies of knowledge employees should be constantly expanded upon to generate inputs for the organisations. As with any other physical asset, if they do not, they lose value. Therefore, organisations need to deliver relevant training and development sessions to maintain their 'asset' (Yew Wong, 2005). Recruitment drives need to consider any cross-training requirements and the culture of continuous improvement (Stamm, 2011). (Achanga *et al.*, 2006) state that the standards for abilities and proficiency need to include the hiring and development of talented people and to include training and advancement. The values can be included into the recruitment and selection process by designing specific questions for interviewers that can help them identify if prospective recruits would fit with a company culture (Cummings and Worley, 2014). Deciding what staff to train in improvement methods can be carried out through a role simulation detailing what the job would be like, carrying out a selection procedure designed to see how the participants skills would fit in with a certain climate. Nepotism needs to be avoided at all costs as they can cause conflicts of interest. Recruitment and promotion needs to be a strict process based on skills, experience, successes and qualifications and remuneration needs to be based on each employee's performance (Al-najem, 2014).

4. Feedback system

Data related to the operation or production results is known as feedback (Cummings and Worley, 2014). Not all the data available, however, can be considered as feedback: just that which can be used to determine the prospective capabilities of the system. Feedback can be useful for maintaining consistency or for driving through changes. An example of this is McDonald's, which has a strict feedback procedure to make sure that the meals served in any restaurant, in any location, are as alike as they can be. Feedback can also determine the level of information given to an employee about how efficiently they are performing their tasks (Cummings and Worley, 2014). Forza (1996) added that to achieve successful Lean implementation the organisation requires certain aspects, such as: Womack and Jones (2003, p. 15) explain that Lean is

a method of doing more with less: less workforce; less tools; less time; and less space and gives consumers what they want while providing job satisfaction. This is done through instantaneous feedback so as to change Muda (waste) into value (AL-Najem *et al.*, 2013). However, a reason for not doing feedback mechanisms was a lack of support from the human resources (HR) department and top management (Al-Mashari and Al-Mudimigh, 2003).

Feedback systems enable the quality risk management improved by providing information by the employees themselves (Tsang and Antony, 2001; McLean, Antony and Dahlgaard, 2017). Forza (1996) explained that successful Lean implementation needed certain factors. These include suggestions from employees that are considered. Feedback on the quality of initiatives, for example, waste elimination and feedback to employees regarding the processes and machinery they use. Visual illustrations of data can be used to relate the results, such as charts. The feedback process needs to be clarified. This can be done at weekly meetings, or over time. Weekly meetings are useful for reviewing the data, making decisions and drawing up solutions (Cummings and Worley, 2014). Nadler (1976) stated that there were five characteristics to an effective feedback process (Nadler and Cammann, 1976; Huse, 1980; Nadler and Tushman, 1980, 1999; Beer and Walton, 1987; Wang and Huzzard, 2011). Van Teijlingen and Hundley (2001) quoted Peat *et al.* (2002, p. 123) to say that feedback is vital from the workshop floor to determine any lack of clarity and to improve the situation in the workshop. Monthly feedback surveys regarding leadership consists of the person being examined, and their co-workers, to assess the leader's performance (AL-Najem *et al.*, 2013). A survey can also be useful for identifying any strong or weak areas in the company or department under scrutiny. The survey composition depends on the level of co-operation between units (Nadler, 1976). These methods of gathering information are useful for relaying back data about the Lean process itself, the views of the employees and progress regarding the results of the implementation (Huse, 1980). Continuous and regular collection of data is useful for obtaining a view of the organisation's progress. This data can be useful for understanding the process (what needs to happen for it to be

achieved) and to plan for the next stages. The feedback can go through several cycles of information gathering and planning or the next stage (Tsang and Antony, 2001; Godinho Filho, Ganga and Gunasekaran, 2016; McLean, Antony and Dahlgaard, 2017).

For example, a long-term study of survey feedback in an underground mining operation suggested that continued, periodic use of survey feedback can produce significant changes in the infrastructure of the organisation, HR department, management process, health and safety, layout of the workshop, quality improved finally the productivity within the organisations (Huse, 1980; Gavin, 1985; McLean, Antony and Dahlgaard, 2017)

5. Training and education

Training can be explained as the education of a person in the knowledge, comprehension, abilities, outlooks and way of behaving to be able to complete an allocated role of task. Training and development is a vital component for the improvement of operations and progression and can improve employee performance, which has a huge influence on the company in general (Oakland, 1994; Oakland and Tanner, 2007).

The Lean method requires a team approach, so team concepts are elements that should be highlighted during training. Employees need to be taught the methods and procedures for Lean by a Lean specialist (Womack and Jones, 1996; Lewis, 2004; Koenigsaecker, 2005). Training needs to be scheduled so that it is delivered just as it is needed so that employees don't forget what they have learned and can use it immediately. Training is an important way for the implementation team push through the changes needed (Womack and Jones, 1996; Lewis, 2004). To increase flexibility and to learn how to provide solutions, employees need to be developed in problem-solving methods and to train in multiple areas of the organisation. (Ghobadian and Gallear, 1997; Knuf, 2000; Dahlgaard and Mi Dahlgaard-Park, 2006; Shah and Ward, 2007; Sim and Rogers, 2008b; Puvanasvaran *et al.*, 2009; Bhasin, 2011; Kundu and Manohar, 2012; Nordin *et al.*, 2012). Training and education has been cited as the second top successes factor for lean implementation. In addition, training and education

is a key factor for sustain continuous improvement. Also, training on soft skills and technical skills are equally important for lean implementation. (Achanga *et al.*, 2012; Albliwi *et al.*, 2014b, 2017). Lean training helps the practitioners to learn the basic knowledge and skills for improvements (Wan and Chen, 2009). The training needs are to be determined by competency mapping by human resource department (R. Jadhav, S. Mantha and B. Rane, 2014).

Training and education is an intervention strategy designed to impart knowledge, build skills, and change behaviour. While not a fix-all, training activities are often an effective way to accomplish several different business objectives (Al-najem, 2014; Salem *et al.*, 2016). Training aligned with business strategies involves setting objectives that map directly to organisational goals (Zhou, 2012b). Training initiatives must spring from a very clear set of defined objectives. Often, this is achieved by starting with employee needs assessments (Haque and Chaudhuri, 2015). Training and education concepts apply to both individuals and organisations. For this reason, a needs assessment may be focused on the needs of the employees, the needs of a job, or the needs of the business (Womack, Jones and Roos, 1990; Ramaswamy, Selladurai and Gunasekaran, 2002; Dahlgaard and Mi Dahlgaard-Park, 2006; Achanga *et al.*, 2012; Al-Najem, Dhakal and Bennett, 2012; Albliwi *et al.*, 2014b; Elnadi and Shehab, 2015; Alkhoraif and McLaughlin, 2016; Rise and Haddud, 2016). The more focused training and education gives evidence for a better understanding among personnel of the key principles of lean initiating and flow of value (R. Jadhav, S. Mantha and B. Rane, 2014). Lean implementation will reach its intended purpose if there are appropriate training and education methods and knowledge transfers (Cudney and Elrod, 2010).

6. *External sources*

Lean implementation requires investments in hiring experts and consultancy to improve the Lean implementation process, and this required managers and leaders commitment who believe in improving the process, which will lead to enhance the processes of continuous improvement (Inman and Mehra, 1990;

Boughton and Arokiam, 2000; Achanga *et al.*, 2006; Sim and Rogers, 2008b; Boyle and Scherrer-Rathje, 2009; Puvanasvaran *et al.*, 2009; Bhasin, 2011; Kundu and Manohar, 2012; Nordin *et al.*, 2012; Dombrowski and Mielke, 2014b). Implementing Lean involves a considerable amount of change in organisational culture, routines, methods and the mind-set of the employees. Due to this upheaval, organisations often find it best to bring in an external specialist to drive through the changes (Tracy, 2007).

Scherrer-Rathje *et al.* (2009) researched a European producer of food processing machinery. This company sought outside validation of their project and this helped to succeed. This was because a specialist was able to advise them and they wanted to push the process through quickly (Smith, 2003; Ballé, 2005). The lean implementation team might have the necessary experience, but external consultants might be required to provide an additional beneficial perspective in the planning stage (Mostafa *et al.*, 2013). So, the best method, early on, is to gather a specific Lean team and to bring in external specialists (Netland, 2016). As more employees receive the appropriate training, the requirement for the Lean team is reduced and the input and participation of the employees increases (Kovacheva, 2010; Netland, 2016).

7. Resources to invest

One of the biggest issues facing organisations in both countries and industries (Desai, Antony and Patel, 2012) is a lack of resources. This can include technological, staff and budget (Helena Boarin Pinto *et al.*, 2008; Gamal Aboelmaged, 2011). Aboelmaged (2011) carried out a survey on Lean Six Sigma in the United Arab Emirates, in both the manufacturing and services industries and the results found that the most common reasons for failure were a shortfall in available resources, such as budgetary and managerial resources. There were also problems identified due to no commitment from management (Albliwi *et al.*, 2017). In the developed World, a lack of resources was identified as the main reason for failure of quality programmes and countries where this was found include Australia, the UK, Brazil (Pinto *et al.*, 2008) and Denmark (Rahbek Gjerdrum Pedersen and Huniche, 2011; Rise and Haddud, 2016).

Thus, this shows how a lack of resources such as technical, staff or budget can cause failure in a LSS project.

Another major contributor to failure is the absence of managerial supporting and knowledge (Burcher et al., 2010; Pedersen and Huniche, 2011; Pinto et al., 2008; Albliwi et al., 2017). Nonthaleerak and Hendry (2008) carried out a study in Thailand, which identified that the Lean Six Sigma programmes implemented there failed due to certain processes, such as the lack of resources. This was also determined to be the main reason for failure in the manufacturing industry in India (Antony and Desai, 2009). Singapore suffered from reasons of sustainability of their Six Sigma programmes, which are very difficult processes. Organisations were finding that they needed to recruit additional part-time staff as they didn't have the necessary staffing capabilities but this made it difficult for them to maintain sustainability (Chakrabarty and Kay Chuan, 2009). This would seem to suggest that, regardless of the environment or country that an organisation operates in, a lack of resources is a common problem, whatever the organisation size. Funding is also an obvious issue for most companies (Albliwi *et al.*, 2017). SMEs in particular, along with a shortfall in staffing, would find this to be common issue and one of the main reasons for failure when trying to implement Lean Six Sigma (Antony, 2008; Antony et al., 2005; Kumar et al., 2009a, b). Therefore, managers need to ensure that they have everything that they need prior to commencing any project within their company (Kumar et al., 2009a; Pepper and Spedding, 2010).

Investment is necessary for a Lean implementation for education, recruitment of external specialists, equipment for the visual aspects and permitting core staff to become empowered. These are crucial issues that need to be monitored by senior management (Dora and Gellynck, 2015; Dora, Kumar and Gellynck, 2015). Access to funding is another crucial aspect for a successful Lean implementation as it is needed to pay for training and external specialists (Achanga et al. 2006). Before a Lean process even begins, financial outlays are needed to pay for planning, assessment, specialists and training and development of staff. It may also be needed for any changes needed in the

company's layout if necessary to support Lean (AL-Najem *et al.*, 2013; Al-najem, 2014) as this aspect may be necessary for the development of a culture that supports quality initiatives (Bhasin and Burcher, 2006). If these initial factors are not dealt with early on it can cause the Lean implementation to fail (AL-Najem *et al.*, 2013; Al-najem, 2014). Sufficient resources are a significant factor to consider when planning a Lean implementation. These include ample funding for training and consultants, which are vital for the success of implementing Lean (Bhasin 2008; Trkman 2010). Senior management are responsible for providing sufficient resources for the implementation of Lean. Particularly in SMEs, this access to resources has been identified as an important determining factor for a successful Lean implementation (Achanga *et al.* 2006).

8. Top management and leadership commitment

Commitment and support from the senior management team and leaders has often been cited as vital to the success of a Lean implementation because a change process requires total commitment and will use much management time and effort (Powell, 1995). A negative attitude to change has been identified as one of the main reasons for failure among Lean programmes across all industries, countries and company size (Albliwi *et al.*, 2017). Several researchers, for example, Ho *et al.* (2008), Kwak and Anbari (2006) and Snee (2010), have proposed that a lack of commitment and support from senior managers will cause Lean implementation to fail. The senior management team is responsible for making sure that all the necessary resources are in place and that there will be no issues while the process is ongoing (Martinez-Jurado and Moyano-Fuentes, 2012; Snee, 2010). This has been identified as important to determine whether Lean Six Sigma will succeed or fail (Albliwi *et al.*, 2017). Also, enthusiasm from senior managers motivates employees to produce ideas if they encourage openings. As senior managers are influential in the forming of the culture and climate of an organisation, it is necessary for them to be on board for the Lean implementation process (Powell, 1995; Karim *et al.*, 2011; Lam and Rahma, 2014; Laureani and Antony, 2016b; Schneider *et al.*, 1996).

Having the senior management team create and maintain the Lean culture is a core factor.

This can be difficult for an older, more established company who needs to sustain the step by step process and merge in the changes caused by Lean. Effective leadership, therefore, requires an increase in the cooperation of strategy, structure, culture and methods, while at the same time accounting for the huge changes that Lean brings about (Tushman and O'Reilly III, 1996, p. 11). Especially in more mature companies, senior managers play a huge part in leading Lean processes. By promoting testing and trialling, ensuring that necessary resources are in place for exploratory projects and providing a view of the ideal vision, senior managers are very influential in generating a Lean culture (Al-Najem, Dhakal and Bennett, 2012; Albliwi *et al.*, 2017). Senior managers need to play a participative role, not a passive one, while motivating continuous Lean programmes in their companies (Lam and Rahma, 2014). Managers need to show their commitment, not just say they are committed otherwise there is no consistency between the organisation's culture and the one the managers are trying to introduce (Leifer *et al.*, 2000). The wrong amount of control can have a detrimental effect on creativity and initiatives to promote Lean can seem to disagree with best business methods. The inconsistencies obvious in the various methods of innovation generate problems and conflict between the established, financially viable departments and the newer, innovative but risky ones (Yew Wong, 2005; McLaughlin, Bessant and Smart, 2010; Achanga *et al.*, 2012; Arshida, 2012; Deros, 2014).

SMEs usually have less problems with support from management as their structures are more responsive. This means that management pursuits, such as support and commitment, are more readily obtained than in larger companies. However, training and development is more difficult in SMEs (Antony, 2008). Kumar and Antony (2009a) state that supportive leadership and commitment are vital for implementing and maintaining change in culture initiatives in Lean implementation in SMEs. Demonstrative commitment from senior management includes funding, support, participation and monitoring of

the Lean implementation process. SME managers in particular have an important commitment role to play because of their close participation with daily activities, budgetary support and role as motivator within their teams (Dora *et al.*, 2013b; Dora, Kumar and Gellynck, 2015). (Boyer, 1996) verified the importance of commitment from senior managers and explained that it was a significant aspect for increasing the chances for success in Lean. Due to their inherent participation in activities such as daily operations (Wessel and Burcher, 2004), supervision (Ghobadian and Gallear 1997), proximity to the point of delivery (Baba, et al., 2006), comprehension of procedures and customer base (Beaver and Prince, 2004) SME senior managers are perfectly positioned to demonstrate their commitment to the success of the Lean process (Phelps et al., 2007). Lean managers also need to understand and appreciate human factors such as moral, productivity, physical health and safety concerns during the Lean implementation process (Childe, 2007). The commitment of top management and leadership to provide training, employee involvement and participation, sources, strategy, vision and performance evaluation system, good communication and structure were important to lean implementation success (Womack, Jones and Roos, 1991; Achanga *et al.*, 2005, 2012; Golicic, Advances and 2007, 2007; Bakås, Givaert and Van Landeghem, 2011; Karim *et al.*, 2011; Lam and Rahma, 2014; R. Jadhav, S. Mantha and B. Rane, 2014; Dombrowski and Mielke, 2014b; Salem *et al.*, 2016; Dora, Kumar and Gellynck, 2016; Godinho Filho, Ganga and Gunasekaran, 2016; Albliwi *et al.*, 2017; Berlec *et al.*, 2017).

In addition, criteria for rewards should be defined with a more holistic and systemic emphasis fostering contributions for the company as a whole rather than encouraging local departmental improvements (Nofal, Omain and Zairi, 2005; Cheung, Wong and Wu, 2011; Wahjudi *et al.*, 2016). This refers to the use of performance-contingent reward systems that link compensation, promotions, and recognition to individuals, groups, and organisational performance (Nofal, Omain and Zairi, 2005; Cheung, Wong and Wu, 2011; Nordin *et al.*, 2012; Asnan, Nordin and Othman, 2015; Laureani and Antony, 2016b). This highlights the importance of creating a new reward system that

rewards the on-the-job behaviour that is the goal with the lean implementation (Judge, Fryxell and Dooley, 1998; Yew Wong, 2005; Arshida, 2012; Laureani and Antony, 2016b). A crucial motivational factor is suitable rewarding system. The rewarding system is crucial important in lean implementation (Karlssoon and Ahlstrom, 1995). Table 5-2 presents the interventions developed from literature review.

Table 5-2 interventions identified from literature (source: by author)

No.	List of interventions	References
9.	Knowledge-share management system	Cummings and Worley, 2014; Nonaka and Takeuchi, 1996; Dombrowski, Mielke and Engel, 2012; Argote,2013; DeLong,1997; Von Krogh, 1998; Yew Wong, 2005; Wenger, 1997; Leonard and Sensiper, 1998; Morten T, et al. 1999; Davenport and Prusak, 1998; Holsapple and Joshi, 2000; O'Dell and Grayson, 1998; Garvin, 1991; Dollinger, 1984; Brush, 1992; Brush and Vanderwerf, 1992; Davenport and Prusak, 1998; Desouza and Awazu, 2006; Yew Wong, 2005 and Alavi and Leidner, 2001.
10.	Health and safety climate	Johansson and Abrahamsson L, 2007; Schneider,1990; Jadhav et al., 2015; Alli, 2008; Health and Safety and Executive, 2008; Hsa, 2006; Cooper, 2000; Safe Work Australia, 2013; Camuffo, De Stefano and Paolino, 2017; Asad Sadi and Al-Dubaisi, 2008; Vincent, 1997; Wong, Wong and Ali, 2009a, 2009b; Verbano and Turra, 2010; Safe Work Australia, 2013; Maestas and Parrish, 2014; Longoni et al., 2013; Wong, Wong and Ali, 2009b and Dora et al., 2013a;
11.	Recruitment and selection process	Su and Yang, 2015; Ingelsson, Eriksson, and Lilja, 2012; Yang, 2006; Yew Wong, 2005; Stamm, 2011; Achanga et al., 2006d; Cummings and Worley, 2014; Al-Najem, 2014 and Robertson and Hammersley, 2000.
12.	Feedback system	Cummings and Worley, 2014; Al-Mashari and Al-Mudimigh, 2003;Womack and Jones, 2003; Forza,1996; Al-Najem et al., 2013; Folkman, 2010; Nadler, 1976; Peat et al., 2002; Teijlingen and Hundley, 2001; Gavin, 1985; Nadler and Cammann, 1976; Huse, 1980; Nadler and Tushman, 1980, 1999; Beer and Walton, 1987; Wang and Huzzard, 2011
13.	Training and education	Gupta and Brennan 1995; Lee 1997; Ramaswamy et al. 2002; Achanga et al. 2006, Kumar et al. 2009; Timans et al. 2012; Dora et al. 2013; Oakland, 1994; Oakland and Tanner, 2007; Womack and Jones, 1996; Lewis, 2004; Koenigsaecker, 2005; Womack and Jones, 1996; Lewis, 2004; Ghobadian and Gallear, 1997; Knuf, 2000; Dahlgard and Mi Dahlgard-Park, 2006; Shah and Ward, 2007a; Sim and Rogers, 2008b; Puvanavarar et al., 2009; Bhasin, 2011; Kundu and Manohar, 2012; Nordin et al., 2012; Achanga et al., 2012b; Albliwi et al., 2014b, 2017; Jadhav et al., 2014; Salem et al., 2016; Haque and Chaudhuri, 2015

No.	List of interventions	References
14.	External source	Inman and Mehra, 1990; Boughton and Arokiam, 2000; Achanga et al., 2006c; Sim and Rogers, 2008b; Boyle and Scherrer-Rathje, 2009; Puvanasvaran et al., 2009; Bhasin, 2011; Kundu and Manohar, 2012; Nordin et al., 2012; Dombrowski and Mielke, 2014b; Tracy, 2007; Smith, 2003; Ballé, 2005; Mostafa et al., 2013; Netland, 2016; and Kovacheva, 2010
15.	Resources to invest	Achanga et al. 2006; Ravikumar et al. 2013a,b; Ormsby et al. 1994; Lee 1996; Kumar et al. 2009; So and Sun ,2010; Helena Boarin Pinto et al., 2008; Gamal Aboelmaged, 2011; Aboelmaged ,2011; Albliwi et al., 2017; Burcher et al., 2010; Pinto et al., 2008; Rahbek Gjerdrum Pedersen and Huniche, 2011; Rise and Haddud, 2016; Burcher et al., 2010; Nonthaleerak and Hendry ,2008; Antony and Desai, 2009; Antony and Desai, 2009; Chakrabarty and Kay Chuan, 2009; Kumar et al., 2009a, b; Dora and Gellynck, 2015; Dora, Kumar and Gellynck, 2015; Al-Najem et al., 2013; Al-Najem, 2014; Bhasin and Burcher, 2006; Bhasin 2008 and Trkman 2010.
16.	Top management and leadership commitment	Chin and Rafuse, 1993; Lee et al. ,1994; Lee,1997; Achanga et al., 2006; Kumar et al.,2009; Emmitt et al., 2012; Panizzolo et al., 2012; Rose et al., 2014; Timans et al., 2011; Powell, 1995; Albliwi et al., 2017; Ho et al. ,2008; Kwak and Anbari, 2006; Snee, 2010; Martinez-Jurado and Moyano-Fuentes, 2012; Karim et al., 2011; Lam and Rahma, 2014; Laureani and Antony, 2016b; Schneider et al., 1996; Tushman and O'Reilly III, 1996; Leifer et al., 2000; Yew Wong, 2005; McLaughlin, Bessant and Smart, 2010; Achanga et al., 2012b; Arshida, 2012; Deros, 2014; Antony, 2008; Kumar and Antony, 2009a; Dora, Kumar and Gellynck, 2015; Boyer, 1996; Wessel and Burcher, 2004; Ghobadian and Gallear, 1997; Baba et al., 2006; Beaver and Prince, 2004; Phelps et al., 2007; Childe, 2007

5.4 Framework development

The result of the assessment of gauging current perception in Table 4-13 present an evidence of areas of inadequacy with respect of lean culture. The interventions from literature review cover a wide spectrum and are more explained than those suggested by the participants. In addition, the suggestion interventions from data gathering were made within the context of this research. An intervention was developed into lean culture framework to facilitate lean implementation. The framework was built on interventions identified from the literature and data gathering. The flaws recognised in the lean culture assessment from gauging current perception furnish guidance for lean culture aspects that must be adjusted. These interventions are monitored by desired effect from literature review from Table 4-13 and by particular situation of the lean culture to introduce a series of proposed interventions appropriate for nudging the lean culture to be more caring of lean implementation. The planned interventions for SMEs should be acted on together at the same time to develop the climate of lean culture and concentrate on developing confidence to adopt, select and commit to the organisation. This is likely to motivate behaviours that improve lean implementation. Tables 5-1 & 5-2 indicate that the sixteen interventions overlap by data gathering and literature. Therefore, the planned interventions for SMEs manufacturing sector have been emerged into eight interventions. These interventions were used as cornerstone for developing SMEs manufacturing-specific interventions invented to create the settings for a lean culture. The eight intertwined in SMEs interventions are shown in Table 5-3. The framework comprises the following eight interventions:

1. Knowledge management and share system

Central knowledge-share management matters in SMEs is the existing of knowledge loss through key employees departing the companies (Wong and Radcliffe, 2000; Wickert and Herschel, 2001; Finn and Phillips, 2002). SMEs are exposed to this phenomenon, since individuals are continually looking for better careers and job prospects and higher wages in larger organisations. Without doubt, when employees leave a firm, they will take with them all the

experience and knowledge that is firmed in their mind (Yew Wong, 2005). Retaining employees in the firm is highly entrusted on effective people-management strategies. Actually, people management perform a much broader role and it lies at the heart of knowledge-share management (Yew Wong, 2005). From the above review, it has not been frankly directed as a crucial aspect for Knowledge-share management. Face-to-face communication guide to transferring of knowledge, information sharing, which improve equality in the team and also prepare a primary move for continuous improvement by having daily minor meetings, etc. (Holmdahl, 2010).

This stage covers identifying the types of knowledge that will generate the most value for the organisation and then producing mechanisms for growing that stock of knowledge. It starts with investigation of the organisation's competitive strategy – how it seeks to create customer value to achieve profitable results. Once the knowledge required for competitive strategy is identified, organisations need to devise mechanisms for acquiring or creating that knowledge, and then it will be easy to create master plan by using this technology (Huse, 1980; Al-najem, 2014). Databases, computer networks and electronic bulletin boards and discussion groups originate a forum and an electronic society of practice that improves contact between the person looking for knowledge and those who may have reach to the knowledge. For instance, this may be achieved by posting a question in form of 'does anybody know', or a 'looking for help' to the discussion group. These tools may extent the available knowledge both vertically and horizontally in organisations (Alavi and Leidner, 2001; Anand *et al.*, 2009; Achanga *et al.*, 2012; Albliwi *et al.*, 2014b). They also speed access to knowledge and enhance the communication (E. H. Schein, 1990b; Paiva, Roth and Fensterseifer, 2008; Albliwi *et al.*, 2014b). and this was supported by one of the participants No.3:

using the last technology or database system is the right stage for setting up measurement goal and metric to enhance the strategy of the organisation.

It is not new that one of the most common applications on intranets are corporation directories. Such directories do not include the knowledge themselves but enhance individuals to speedily locate the individual who has the knowledge that might help them resolve a present problem. For instance, at Hewlett-Packard, the main content of one system is a set of expert profiles covering a directory of the skills, backgrounds, and expertise of individuals who have knowledge on several topics (Davenport 1997a). These directories allow individuals to much more rapidly locate the knowledge needed for problem answering. Often such metadata (knowledge about where the knowledge resides) shows to be as significant as the original knowledge itself (Andreu and Ciborra, 1997).

2. *Managing family influences*

This intervention can be achieved through implementing a process where family influences are excluded from decision making related to Lean by conducting a review board to prevent family members from interfering with the whole organisation process, where the board could be from member of the company such as manager or worker, as the participants from interviews and focus group agreed that managing the family influence will create a climate of lean culture. In addition, family-maintained businesses have a shortage of abilities to implement lean exprices, which makes them delay behind non-family-maintained businesses (Astrachan and Kolenko, 1994; Al-najem, 2014). Graves and Thomas (2006) also found that the non–family-maintained organisation have well managerial skills compared to family-maintained organisation. This relationship was identified when a participant No. 17 said:

The manager who own the business never trust us when we do our job... just we take an order from him, all the time.

Another participant No. 9 added:

there is a need to a system where the manager (the owner) should manged and controlled through a system.

This intervention would provide the trust among the employees and the freedom to increase their skills by select the right decision-making (Ellington, Jones and Deane, 1996; Levinson, 2011; Achanga *et al.*, 2012; Gupta, Acharya and Patwardhan, 2013)

3. *Health and safety climate and policy*

In this intervention, 'policy' indicates the general goals, approach and objectives – vision – of firm and the standards and principles upon which it bases its action, these form the foundation for managing health and safety which establish the written statement of policy required, policy is used in relative to health and safety (Ally, 2008). The health and safety policy should represent the responsibility of employers to deliver a healthy and safe working environment. Everybody should be made responsible for a duty unless they meet appropriate competence standards. This will give a name or position to the health and safety team (Cooper, 2000; Safe Work Australia, 2013; Camuffo, De Stefano and Paolino, 2017), bring policy information to the notice of every single worker, supervisor and manager; provide, where needed, for measures to adjust with emergencies and accidents, as well as adequate first-aid arrangements; afford equipment without cost to the worker and adequate personal protective clothing, when hazards cannot be controlled; collaborate with other employers in enhancing occupational health and safety; as well as weekly toolbox discussions with supervisor which may consist of, for instance, a reminder of significant health and safety procedures or trainings from a current accident and managing meetings of the central health and safety board (Maestas and Parrish, no date; Dale and Cooper, 1992; Safety and Executive, 2008; Wong, Wong and Ali, 2009a; Camuffo, De Stefano and Paolino, 2017).

This intervention seeks to provide practical advice and recommendations on progressing an occupational health and safety climate for the firm. The words 'safety and health' are used throughout the document for conciseness and to contain the health and safety. This intervention is not planned to be a specification or to be used for certification aims. This intervention will enhance (Vincent, 1997; Hsa, 2006; Alli, 2008; AL-Najem *et al.*, 2013; Longoni *et al.*,

2013; Safe Work Australia, 2013), explains the principles and management exercises that provide the foundation for dynamic occupational health and safety management; sets out the questions that need to be addressed and aids as a tool to progress improvement programmes, self-audits or self-assessments.

4. *Feedback system*

Shah and Ward (2007) highlighted providing a feedback system on delivery and the quality of products, as this will lead to improve the association among the employee and avoid flaws in the future. In addition, Yusof and Aspinwall (2000) added that feedback systems are one of the most important CSF for implementing lean within SMEs. Forza (1996) mentioned that in order to attain successful lean implementation the firm entails certain features, for example: Employee proposals (feedback and realisation) that are taken earnestly; Feedback about quality performance to supervisors concerning features of quality performance for example waste reduction; Regular feedback to workers on the present processes, defect rates, machine breakdowns, etc.; and The use of physical meeting for example face to face. There is a heavy dependence on quality feedback altogether supervisors and workers (Forza, 1996). 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 [...], provide[s] 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*'.

5. *Recruitment and selection process to select appropriate persons*

This intervention is a procedure of seeking for and having potential job applicants from a target pool, campus, or specific area, allowing employers to select the most appropriate candidates to fill the job requirements. In actual fact, there is no best method or commonly accepted process on how to recruit and select candidates because different employers have variety recruitment and selection approaches depending on their needs, operations and size (Leat and El-Kot, 2007; Olsen, 2015; Su and Yang, 2015). Selection actions are

considered important to recognising people who hold capabilities that allow them to make an active involvement (Su and Yang, 2015). However, the recruitment challenge for SMEs manufacturing organisation is not only to run vacancies under swinging business demands, but to recruit high-quality talent that is sought after by plentiful manufacturing organisation (Macduffie, 1995; Nordin *et al.*, 2012; AL-Najem *et al.*, 2013; Zhou, 2016). The role of selection is considered essential to the exercise of strategic human resource management as employee capability is seen in the achievement of employee contributions to the understanding of strategic goals. Selection actions are considered essential to recognising people who own capabilities that enable them to make real contributions (Radeka, 2009; Testani and Ramakrishnan, 2012; AL-Najem *et al.*, 2013; Dombrowski and Mielke, 2014b; Nolan and Garavan, 2015; Su and Yang, 2015). Knowing people's abilities is another significant exercise that supports to prevent wasted talent. By identifying people's abilities, top management and leaders can simply allocate the exact people to the correct tasks (Achanga *et al.*, 2006; Panizzolo *et al.*, 2012; Dora *et al.*, 2013b)

6. *Top management and leadership commitment*

Top management and leadership is the most vital aspect used for lean implementation, as identified by several scholars (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). Lean implementation cannot be established and sustained without top management and leadership commitment. Central aspects such as commitment, knowing people's capabilities, visible management (Gemba), knowing talent people, committing to providing training, respond to feedbacks, motivation and investment in consultants, rewarding system and expertise can support the firm to advance, and avoid inefficiencies such as 'wasted talent' (Achanga *et al.*, 2006; Kumar, Antony and Douglas, 2009; Al-Najem, Dhakal and Bennett, 2012; Panizzolo *et al.*, 2012; AL-Najem *et al.*, 2013; Dora *et al.*, 2013b; Albliwi *et al.*, 2014a, 2017). Commitment from top management is highly essential for lean implementation. This can take several methods, for instance, investing in expertise, consultants and training (AL-Najem *et al.*, 2013).

7. External input

This intervention will enhance the training and increasing the knowledge by investments in consultancy, hiring specialists to enhance the work and benchmarking and this involves commitment from top management and leadership who be certain of in enhance the process, this will lead to improve continuous improvement (Inman and Mehra, 1990; Boughton and Arokiam, 2000; Achanga *et al.*, 2006; Sim and Rogers, 2008b; Boyle and Scherrer-Rathje, 2009; Puvanasvaran *et al.*, 2009; Bhasin, 2011; Kundu and Manohar, 2012; Nordin *et al.*, 2012; Dombrowski and Mielke, 2014b). In addition, participants from semi-structured interview and focus group added that to visit other firms to collect best practises should be required to increase knowledge. Involving external expertise can identify the gap that may exist within the organisation between the change effort and the firms members (Al-Najem, Dhakal and Bennett, 2012; Nordin *et al.*, 2012; Panizzolo *et al.*, 2012; Panizzolo, Bernardel and Biazzo, 2014; Asnan, Nordin and Othman, 2015).

8. Training and education to increase knowledge of lean practices

This intervention focusses on the individual training needs for employees related to the work they are doing in their current positions. Development needs may also be assessed to identify skills or abilities that the employee will have to possess to grow into future positions. Companies may also assess employee needs when deciding whom to select for training. Methods to gather information about employee needs include surveys, face-to-face interviews, formal tests, job records, and simple observation of employee performance (Beer and Walton, 1987; Yew Wong, 2005; Ismail Salaheldin, 2009; Arshida, 2012; Deros, 2014; Laureani and Antony, 2016a). In addition, assessments of organisational training and development needs will attempt to target any deficiencies and build on strengths while shaping future needs at a strategic level; identifying the knowledge, skills, and abilities needed for meeting future needs will drive training and development plans. An HR audit may be used to take a macro look of the needs of the entire workforce. Other measures such as turnover and

retention analysis and studies of employee absenteeism rates help employers identify where HR interventions may be appropriate (Wright and McMahan, 1992; Macduffie, 1995; Bhasin and Burcher, 2006; Leat and El-Kot, 2007; Ali, 2010; Su and Yang, 2015; Laureani and Antony, 2016b). The motives for implementing lean must be well enjoyed and agreeable and firms must supply regular training plans to all employee involving in implementation of lean (Turesky and Connell, 2010; Worley and Doolen, 2006). To investing in training may support in creating employee with multi-tasking abilities that are eligible to identify process bottlenecks and associate to waste reduction (Panizzolo, et al. 2012). Table 36 summarises the proposed interventions for SMEs. The programs of training are typically given by hired consultants or in-house lean champions and merge both classroom training with shop-floor practices (L. Bamber and Dale, 2000; Dahlggaard and Mi Dahlggaard-Park, 2006; Albliwi *et al.*, 2014b; Panizzolo, Bernardel and Biazzo, 2014).

Table 5-3 Proposed interventions for SMEs (source: by author)

No.	Proposed interventions	Desired effect	Based on interventions (from Tables 34-35)
1.	Knowledge management and share system	Move the organisation beyond solving existing problems to become capable of continuous improvement, standardization and applied to organisational tasks. Develop the communication among the employees and in the same time create strong communication of a strong corporate vision.	<ul style="list-style-type: none"> • Implement using new technology communication mechanism to allows fast way communication (1) • Weekly meeting (2) • Document master plan (5) • Knowledge-share management system (9)
2.	Managing family influences	This will lead to enhance the capabilities of the employs' trust in their skills. In addition, added individual responsibilities in their duties. Also, develop the ability to create team a mong the employees. Moving the firms to be more agile and successful in term of managing the firms.	<ul style="list-style-type: none"> • Managing family influences, implement a process where family influences are excluded from decision making (3)
3.	Health and safety climate	keeping health and safety of employees in mind lead to enhance the productivity, visual management, standardized work, ergonomic workstation or cell design, total productive maintenance and infrastructure of the firms. In addition, every activity is to evaluate with an emphasis on safety including well-documented safety policy, formation of safety committee, permanent safety measures and safety audits and this will support to decrease the quality risk.	<ul style="list-style-type: none"> • Weekly meeting (2) • Health and safety (10)
4.	Feedback system	Identifying any ambiguities and difficult questions. Determine the strengths and weaknesses of the organisation. How closely the participating units are linked with one another. Actual performance of the management process, quality inspection and the output results of the system. Control the future functioning of the system. In addition, maintain the system in a steady state. Results involve the degree to which a job provides employees with direct and clear information about the effectiveness of task performance.	<ul style="list-style-type: none"> • Weekly meeting (2) • Feedback system (6) (12)

No.	Proposed interventions	Desired effect	Based on interventions (from Tables 34-35)
5.	Recruitment and selection process	That knowledge and competencies are brought into the organisation. In addition, skills and expertise criterion includes the recruitment and enhancement of capable workforce and provision of training and innovation.	<ul style="list-style-type: none"> • Recruitment and selection process to select appropriate person (5)
6.	Top management and leadership commitment	All the required resources are available such as training, equipment, financial support, encouragement, active involvement, and supervision of the lean initiative. Top management motivates idea generation when it actively encourages the quest for new opportunities. Increasing the alignment or fit among strategy, structure, culture and processes, involvement to innovation process and encouraging experimentation. Leadership involve in day-today operations.	<ul style="list-style-type: none"> • Managing family influences, implement a process where family influences are excluded from decision making (3) • Manage, engage and involve talented people of employee when formulating a new strategy, planning and implementation change (4) • Motivate by promotion and reward systems (7) • Training and education to increase knowledge of lean (13) • Resources to invest (15) • Top management and leadership commitment (16)
7.	External input	Provide an additional beneficial perspective in the planning stage. Establishing a dedicated implementation team and hiring external consultants that effective in the early stages. Interaction with experts generates educated employees and increase their decision making and accountability skills.	<ul style="list-style-type: none"> • Visits other manufacturing firm as an external source for lean implementation process for ideas (8) • External source (14)
8.	Training and education to increase knowledge of lean practices	The employees are well trained to foster improvement and knowledge share. Motivation are provided to encourage people to participate and provide new ideas; worker is highly rewarded for their efforts, Employee empowerment and involvement in lean implantation as the key success factor as the focus is on teamwork	<ul style="list-style-type: none"> • Manage, engage and involve talented people of employee when formulating a new strategy, planning and implementation change (4) • Training and education to increase knowledge of lean (13) • External source (14) • Resources to invest (15) • Top management and leadership commitment (16)

When lean implementation has began, involvement should be upheld. Steady workshops to evaluate progress, outcomes and replan follow-on steps would facilitate the lean implementation (McLaughlin P, 2006). The participants in making the change are a main aspect in improving the desired lean culture. The use of the assessment tools advanced in Phase Two would permit a gauging of existence and concentration of culture and position against an 'ideal' lean implementation at various phases throughout the implementation course. The regular evaluation workshops would assist to keep involvement and ownership, at the same time as an act of an further gauge of development towards the desired culture. These advised interventions are planned versus the main seven themes in Table 5-4.

Table 5-4 interventions and desired culture related to the seven themes (source: by author)

Suggested interventions (from Table 36)	Ideal position (from Table 32)	Theme (from Table 29)
<p><i>Knowledge management and share system (1)</i></p> <p><i>Managing family influences (2)</i></p>	<p><i>The employees and the managers have a good interaction between them. They communicate with each other to know exactly what is important, who is supposed to do what and when. Communication flows perfectly to fulfil the employee needs.</i></p>	<ul style="list-style-type: none"> • Communication and interaction in the organisation
<p><i>Knowledge management and share system (1)</i></p> <p><i>Managing family influences (2)</i></p> <p><i>Top management and leadership commitment (6)</i></p>	<p><i>The organisation has a good planning, tactics and road map to achieve the goals of the organisation for a long-term focus. The sequences of the tasks are undertaken in an appropriate way. The policies within the organisation are clear. A good system of decision making exists and is applied in the organisation.</i></p>	<ul style="list-style-type: none"> • Organisation's Strategy and vision
<p><i>Managing family influences (2)</i></p> <p><i>Health and safety climate (3)</i></p> <p><i>Feedback system (4)</i></p>	<p><i>The infrastructure within SMEs workshop provide with safety and health guide and allows effective communication channels across all aspects of the organisation, the resources made available to the team and the management style in which the team operate</i></p>	<ul style="list-style-type: none"> • Organisation's Infrastructure of the workshop
<p><i>Managing family influences (2)</i></p> <p><i>Health and safety climate (3)</i></p> <p><i>Feedback system (4)</i></p>	<p><i>The organisation operates systematically to achieves the goals of the business process, technology capabilities and operation environment in a collaborative way, identifying risks, taking appropriate actions to move or mitigate those risks.</i></p>	<ul style="list-style-type: none"> • Quality risk management
<p><i>Managing family influences (2)</i></p> <p><i>Feedback system (4)</i></p> <p><i>Recruitment and selection process to select appropriate person (5)</i></p>	<p><i>The employees are well trained to foster improvement and knowledge share. Motivation are provided to encourage people to participate and provide new ideas; worker is highly rewarded for their efforts, Employee empowerment and involvement in lean implantation as the key success factor as the focus is on 'teamwork,</i></p>	<ul style="list-style-type: none"> • Human Resource

Suggested interventions (from Table 36)	Ideal position (from Table 32)	Theme (from Table 29)
<i>Top management and leadership commitment (6)</i>	<p><i>The employee attitude towards change are flexible, the leadership style is primarily concern with the capabilities required enact change successfully, ensures the personal property is aligned with the business strategy, technology, and business process of the company, contribute to teamwork building, cross-functional movement, information transparency ,participative management, teamwork rewarding, open communication and information sharing, knowledge learning and sharing, autonomous leadership and decentralised responsibilities</i></p>	<ul style="list-style-type: none"> • Change management and behaviour patterns
<i>Training and education (8)</i>		
<i>Managing family influences (2)</i>		
<i>Feedback system (4)</i>		
<i>Top management and leadership commitment (6)</i>		
<i>Training and education to increase knowledge of lean (8)</i>	<p><i>The organisation continuously works to improve the employee and process performance. The organisation focuses on increasing capabilities, efficiency and effectiveness. The organisation continually strives to improve cooperation between various functions such as operations, human relations and productions.</i></p>	<ul style="list-style-type: none"> • Sustain continuous improvement
<i>External input (7)</i>		
<i>Knowledge management and share system (1)</i>		
<i>Managing family influences (2)</i>		
<i>Top management and leadership commitment (6)</i>		
<i>External input (7)</i>	<i>Training and education to increase knowledge of lean (8)</i>	

5.5 Framework validation

This section presents the results of validation that judged the construct validity of the presented research. This chapter describes the validation of the developed framework with experts from different fields. The intention of validation through experts is to ensure the quality and strength of the research. The framework was sent to the experts by email, and received back shortly after. Figure 5-2 presents the process of validation.

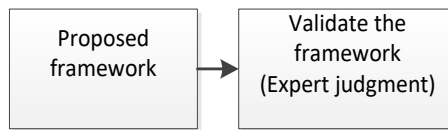


Figure 5-2 Validation process (source: by author)

5.6 Experts' backgrounds

The researcher has sent an invitations to 27 experts via email and LinkedIn. Four experts responded to the invitation to complete the validation. process of the selection was based on their experience in lean implementation in SMEs. The experts endorsed all the performed activities and recommended to add four more recommendations to add. Expert 1 has more than 15 years experience including training and working with Japanese companies; this expert is also involved in lean manufacturing small projects and training in the Middle East. Currently he is the director of 'Coaching for Change' (www.coachingforchange.co.uk). Expert 2 has an academic and research background and is currently working in the higher education industry (East of London University). Expert 3 has 20 years of experience in lean systems and currently he is working with Ethiopian government to implement process of operational excellent techniques. Expert 4 is an academic with a research background in operational research (King Saud University). Table 5-5 summarises the experts' backgrounds.

Table 5-5 Experts judgment (source: by author)

No.	Area	Years of experience
1.	Consulting	15

No.	Area	Years of experience
2.	Academic	13
3.	Academic- Consulting	20
4.	Academic	10

5.7 Key findings

This section presents the experts' comments on the framework. In general, the experts found that the research findings and the output framework seem to be a useful framework. Experts agreed that the framework will create a lean culture for SMEs. However, from the experts' own experience and understanding, they provide some comments that reflect the illustrated proposed framework. The experts provided the following opinions on the current framework, discussed in the following subsections.

1. Top management and leadership commitments

Expert 2 and Expert 3 both endorsed all the performed activities and recommended job rotation as intervention. Expert 2 stated that

The importance of job rotation to lean production lies in its advantage in increasing workers' flexibility to respond to any unforeseen workers shortages or demand fluctuation. the importance of job rotation in enhancing the workers' skills.

In addition, Expert 3 added

as what is significant that naturally each employee goes through job rotation which follows the aim of acquisition knowledge for the whole procedure and on the other hand getting the feeling of belonging to the institution.

Job rotation had been useful in relieving the tedium of the repetitive everyday operators' activities; thereby workers' enthusiasm had been motivated, which eventually had enhanced workers' productivity and performance (Sloan and Rossney, 1988; Van den Bosch, Volberda and de Boer, 1999; Gurusurthy and Kodali, 2009; Yang, Yang and Wang, 2010). Importance was given to improve the

overall skill level of the team through job rotation and the use of job instruction training (Gurumurthy and Kodali, 2009). The Ford model of an employee capability in obvious and repetitive duties has been substituted by teamwork and job rotation, which mostly develop employee morale but likewise yielded genuine benefits in terms of employee suggestions for process improvements (Adler and Cole, 1993; Kovacheva, 2010). The flexibility in lean systems regarding the human resources is characterized by using job rotation, but what the authors conclude right here is that this could put 'boundaries' and lead to low mission identity and meaningfulness of the work carried out Kovacheva. However, Womack calls this anxiety a 'creative tension', due to the fact the job rotation and sharing duty helps workers to resolve best problems at their source. Over these bases different authors record that implementation of the lean practices even increases employees relief (Adler and Cole, 1993; Gurumurthy and Kodali, 2009; Kovacheva, 2010; Arshida, 2012; Nordin *et al.*, 2012). However, job rotation creates a continuous need to develop new capabilities that could have a negative effect on worker health and safety because risks are created when performing new activities (Askenazy 2001; Brenner, Fairris, and Ruser 2004). Although job rotation allow firms to efficaciously implement lean practices and respond rapidly to adjustments in processes and products and need the commitment from top management to be successful (Elnadi and Shehab, 2015). Womack et al. (1996) stated that through rotating jobs, workers can remedy quality issues in an effective and positive way.

Additionally, fairness at work intervention was recommended by Expert 1, who stated:

Excellent organisation managers improve and launch the full achievable of their employee at an individual, team-based and organisational level. They promote equity. In addition, the approach required fairness in reporting and collecting information and in the treatment of any respondents

and also mentioned that:

Without a strong commitment from the top management to develop a healthy culture, based on fairness, most organisations will not get very far in lean implementation.

Many features and attitudes have pushed Toyota to be triumphant and made Toyota's employees unique from other employees around the worldwide. Some of these characteristics consist of a feel of equity at work, a willingness to improve, safety at work, with Toyota's lifetime employment policy, no obstacles between senior administration and workforce, and the opportunity to be promoted to managerial positions. These attitudes and features have consolidated senior administration with workforce and made them a strong unit (SUGIMORI *et al.*, 1977; Womack, Jones and Roos, 1990; Ali, 1995; Krijnen, 2007; Marksberry, Badurdeen and Maginnis, 2011; Al-Najem, Dhakal and Bennett, 2012; AL-Najem *et al.*, 2013). This has supported Toyota to perform its goals; however, some of these features are now not simple to imitate. According to Briggs (1988), a wide variety of features and attitudes are no longer exportable commodities, as they are so tightly registered to the Japanese tradition and values.. Fairness and values promoting collaboration in relationships between workers and organisation form the basis of Toyota's success, as well as the company's commitment to continuously improving processes by fair treatment (Bortolotti, Danese and Romano, 2013). Fairness is closely related to support and is positively associated with affective commitment (Folger and Konovsky, 1989; Konovsky and Cropanzano, 1991; Loi *et al.*, 2006). Fairness tends to be communicated through policies and practices. Downsizing during organisational changes, such as the implementation of lean production, is a very sensitive measure of fairness, seen by workers as unfair (Cameron, 1994).

2. Recruitment and selection process to select appropriate person

Expert 3 and 4's advised beginning tentative interviews to recruiters by using focus group activity to identify the talent, leadership and innovative people under *Recruitment and selection process to select appropriate person* intervention .

Expert 3 stated that

focus group activity or meetings will be a powerful technique to identify the talent, leadership and strong person, within the focus group activity, for example we can gave them a case study to let them propose some solution

and added:

focus group activity could positively contributed to select the right people and create a lean culture.

In addition, Expert 4 stated that:

Human resources management should apply a focus group system to identify the talent, trained and knowledge people

and added

starting a discussion or a dialogue could apply in focus group to investigate how the participants deal with a scenario action.

Lockwood and Ansari (1999) used a center of attention team to obtain in-depth insights into a variety of recruiting and retention techniques for IT professionals. In addition, a focus group activity is used to generate in-depth insights and to uncover knowledge that is tentative. Consequently, focus groups are an economic way to achieve interview information and are in particular advantageous in understanding precise problems in greater depth in terms of selected the right people (Beer and Walton, 1987)

3. Knowledge management and share system

Expert 1 suggested adding encouragement of ideas and creativity for the employees, stating:

It can be a powerful technique to use and releasing employees' ideas and their creativity and potential, reducing bureaucracy and costs, improving productivity, and introducing quality service to customer by capturing these ideas and store it in such as database or by using a technology

and

It is only when involvement the ideas and creativity will fuel process improvement.

Pakdil and Leonard (2015) advise a variety of organisational aspects that create the cultural infrastructure of a firm and affect the achievement of lean management. One of these aspects is worker creativity (Pakdil and Leonard, 2015b, p. 726). Liker (2004) provides to the list unused worker creativity as a main type of waste. The supply for the activation of hidden sources is the creativity and innovative functionality of workers (Mertins and Jochem 2001). Not fully utilizing creativity is an

vital issue that firms need to pay attention to. This kind of waste can emerge when a firm assigns overqualified employees for lower demanding jobs (according to George, 2003, this means that the firm is no longer utilising employees' intellectual creativity, experience or skills, which is viewed as waste), or will pay for coaching that provides no value to the ongoing procedure (Benson and Kulkarni, 2011). In addition, other essential elements consist of the nature of work has modified a lot throughout the previous decade or two and that creativity and innovation are turning into importance to the organisations. These altering and challenging factors, jointly with the growing trend toward team-based work, spotlight the significance for firms to be in a position to make use and continually enhance the employees' mental possibility and talents, which is the manager's accountability to fulfill his or her leadership (Reynolds and Gutman, 1988).

5.8 Summary of expert's comments

The experts endorsed all the performed activities and recommended to add *job rotation* and *fairness at work* to increase the skills of the employee and interact with top management and leadership commitment within the process of initiating lean implementation, which will help change the behaviour of patterns (Elnadi and Shehab, 2015). In addition, *encourage ideas and creativity* will increase the interactive among the employee and store the ideas in database. Experts emphasis on this framework that will encourage to create lean culture within SMEs which helps organisations develop the creativity, flexibility and successful strategies to pressing problems. Also, apply a reward system to encourage the productivity within the organisation. Table 5-6 below presents the experts' comments. Table 5-7 represents the final version of the framework.

Table 5-6 Expert's review (source: by author)

Interventions	Experts judgment			
	E1	E2	E3	E4
1. Knowledge management and share system	<ul style="list-style-type: none"> Encourage ideas and creativity for the employees 			
2. Managing family influences				
3. Health and safety climate				
4. Feedback system				
5. Recruitment and selection process			<ul style="list-style-type: none"> Added focus group activity to identify the talent, leadership people 	<ul style="list-style-type: none"> Added focus group activity to identify the talent, leadership people
6. Top management and leadership commitment	<ul style="list-style-type: none"> Fairness at work to create trust between senior management and shop floor workers. 	<ul style="list-style-type: none"> Job rotation to gaining knowledge for the whole process 	<ul style="list-style-type: none"> Job rotation to gaining knowledge for the whole process 	
7. External input				
8. Training and education to increase knowledge of lean				

Table 5-7 Final version of the framework (source: by author)

FRAMEWORK TO FACILITATE LEAN IMPLEMENTATION			
<p>Knowledge management and share system</p> <ul style="list-style-type: none"> • Computer networks. • Database and electronic bulletin boards and discussion groups • Create a forum and an electronic community of practice that facilitates contact between the person seeking knowledge and those who may have access to the knowledge. • Face-to-face communication and meeting which leads to transferring of knowledge 	<p>Managing family influences</p> <ul style="list-style-type: none"> • Conducting a review board to separate family member's Interfering within the whole organisation process. Managing the family influence will create a climate of lean culture. 	<p>Health and safety climate</p> <ul style="list-style-type: none"> • Written statement of policy required, policy is used in relation to health and safety • Meeting of important health and safety procedures or lessons from a recent accident and chairing meetings of the central health and safety committee. • Document for conciseness and are intended to include the safety, health and others at work due to work activities • Auditing and reviewing for health and safety climate 	
<p>Training and education to increase knowledge of lean</p> <ul style="list-style-type: none"> • Training needs for employees related to the work • Assessed to identify skills or abilities that the employee will have to possess to grow into future positions. • Observation of employee performance. 	<p>LEAN CULTURE</p>		<p>Feedback system</p> <ul style="list-style-type: none"> • Constant feedback to employees on the recent processes, defect rates, machine breakdowns, etc., visible meeting such as face to face to help improve the relationship among the employee and avoid mistakes. • Feedback questionnaire and survey for each month.
<p>External input</p> <ul style="list-style-type: none"> • Visits other manufacturing firm as an external source for lean implementation process for ideas • Investments in consultancy and hiring experts to improve the work 	<p>Top management and leadership commitment</p> <ul style="list-style-type: none"> • knowing people's capabilities • Managing talent people • Providing training • Rewarding system • Motivation to encourage people to participate and provide new ideas • Investment in consultants and expertise. • Managing family influences. • Allocating resources to creativity and innovative capability of employees • Employee involvement • Leadership involve in day-to-day operations. • Fairness at work to create trust between senior management and shop floor workers. • Job rotation to gaining knowledge for the whole process 	<p>Recruitment and selection process</p> <ul style="list-style-type: none"> • A realistic job preview providing information about what it will be like to work in such situations • Team member involvement in a selection process oriented to potential and process skills of recruits can facilitate a participative climate. • The family owners of the business should not be joined • Focus group activity to identify the talent, leadership people 	

5.9 Chapter summary

As has been discussed in chapter 5, the framework that has been outlined in this study is based on eight interventions developed from literature review and data gathering to facilitate lean implementation within SMEs to enhance the eight themes were developed during the research (see Table 4-9). The results from gauging current perception of participants shows that change management and behaviour patterns and sustain continuous improvement are perceived as being low. In addition, the participants also feel that management and leadership support and commitment for activities is low. Moreover, the influence of the owners of the firms are extremely effecting the entire process of lean implementation. In evaluating interventions to develop lean culture, the interventions pooled from the literature review and data gathering indicates a need to provide strong commitment, support from leadership and managing the family influence to facilitate lean culture. This provides a legitimacy for what could be considered as counterproductive practices for top management and leadership commitment and managing family influences in the business context. In addition, Top management ownership and involvement is critical to the success of the proposed interventions. In conclusion, the chapter identified a framework to facilitate lean implementation within SMEs manufacturing sector, through a series of interventions to facilitate lean culture. Top management and leadership commitment and managing family influences are the key component of developing lean culture. A schemed set of connected interventions to improve lean culture particularly for the SMEs manufacturing sector was progressed. eight interventions were identified linked with their themes. This chapter presents feedback on the framework obtained from the expert judgment. The feedback on the findings was positive. The experts' comments were added to demonstrate the impact and practicality of the research. In general, the experts saw this framework has demonstrated to a satisfactory level the value of the proposed lean manufacturing transformation strategy.

6 Chapter 6: Discussion

6.1 Introduction

This research has explored and developed a framework to facilitate lean implementation within the SMEs manufacturing sector. The literature review discusses the diagnosis of lean culture and helped to make observations on what intervention may be valuable to improve lean implementation. The research explored relevant existing literature on lean systems, organisational culture and the Saudi Arabia context. The framework dimensions and components were defined and correlated and constructed as lean culture to better facilitate lean implementation. The landscape of lean culture is not well-understood and so the stages to reach there are not obviously visible. This paper addresses the planning activities connected with this journey. In this chapter, the research findings will be discussed.

6.2 Framework development

The link among organisation culture as well as lean manufacturing implementation is highly critical and sensitive. Organisational culture is the most common factor as the authors agreed should be considered. Firms should take these challenging matters into consideration when adopting and applying lean manufacturing. Assessing the organisational culture's contribution toward lean cooperation is recommended and is one of the implementation basics of lean manufacturing (Pérez-Porras et al., 2014; Chen and Meng, 2010a). In addition, the research on lean implementation is rising. Several scholars from different experiences have started to explore, analyse, describe and explore the notion of lean systems. In this research, exploring this literature was necessary in order to identify the lean implementation CSFs, as well as inhibitors and enablers in terms of organisational culture aspects to develop a framework to improve lean implementation within SMEs manufacturing sector. Despite the existence of literature on lean culture, a absence of efforts was observed in determine how the existing service offering process can be enhanced and improved using organisational culture aspects. In addition, it was discovered

that there is no such a research focusing on lean implementation within the SMEs manufacturing sector in Saudi Arabia.

Research on lean practices is burgeoning as organisations aim to embed lean practices within their operations. Since lean practice has a reputation of being challenging to implement, not all organisations will be successful in the implementation of their lean objectives. Although considerable research has been conducted into lean manufacturing, research investigating methods for optimal lean implementation within SMEs has been relatively neglected: there has been no emphasis on identifying a lean implementation framework, and similarly no emphasis on highlighting enablers and challenges for lean implementation within SMEs. Research into application of lean approaches for SMEs has primarily been carried out within a Western context, focussing on lean implementation. This report aims to further existing knowledge on lean implementation, facilitating convergence towards greater precision, standardized comprehension and optimal ways forward for investigation and explore of lean implementation within SMEs in Middle Eastern nations.

Lean implementation within SMEs is influenced by a wide variety of parameters. Information derived from semi-structured interviews with 29 SMEs subjects indicated a variety of relevant factors, including decision-making factors, in addition to a host of others: lack of a skilled workforce; effective recruitment difficulties; identification of suitable reward and motivation; appropriate education and training; technological factors; lean implementation knowledge and experience; teamworking; leadership styles; and health and safety. However, influence of family owners, resistance to change and training were identified as the predominant concerns within the interviews. These parameters detrimentally influence the capability of organisations to establish a quality lean culture as a consequence of the restrictions they emplace on effective communication and teamworking. Furthermore, it was highlighted that the organisations do not pursue a transparent strategy with regard to employee participation in process improvement or in facilitating continuous improvement measures. In general, organisations do not employ good practice and overlook

a great many critical factors, including: appropriate labelling; effective equipment management; efficient floorspace management (e.g. provision of designated areas for tools and equipment); ensuring satisfactory maintenance of tools and equipment; employing VM methodologies (e.g. charts, instructions, schedules.); providing of safe working environments (e.g. Ventilation, personal protective equipment.); utilisation of appropriate process layouts (with appropriate flow regarding WIP.); provision of adequate storage areas; provision of workers' uniforms; ensuring that the workplace is kept clean and tidy; utilisation of employee suggestion schemes; provision of staff welfare rooms; and record-keeping for important concerns (eg. cycle time, lead time).

These structured observations resulted in an improved comprehension of the findings from the semi-structured interviews. In addition, this data-gathering offered greater transparency in relation to key current issues within SMEs. In particular, it was highlighted that generally, shop-floor workers are ignored by senior management and consequently tend not to make significant contributions to business improvement processes, perhaps due to the inferior skills of the shop-floor workers themselves, but also due to the absence of trust, loyalty and effort by senior management to ensure worker participation at every level. Additionally, data-gathering indicated that the lack of workforce participation promoted by senior management resulted in many employees disagreeing or disbelieving the benefits offered by lean implementation, with a view that this was something enforced on them by senior management. Such opinions were also highlighted by the 29 subjects participating in the semi-structured interviews.

Moreover, this study also identified deficiencies in training and recognition, noting that SMEs are not implementing rational approaches to address challenges and enhance processes. Mersha (1997) states that lean implementation necessitates a skilled workforce, capable of working as a team to provide working solutions. This observation concurs with the findings of Antony et al. (2008), who reported that financial limitations prevented SMEs from offering sufficient staff training. In addition, acknowledgement and

comprehension of the advantages and principles of lean approaches have been observed to be lacking, with experience of lean implementation absent in SMEs. All these findings concur with earlier literature (Youssef and Zairi, 1995; Al-Khalifa and Aspinwall, 2000; Garza-Reyes et al., 2011), indicating that Saudi Arabia and its Middle Eastern neighbours have some distance to go in establishing lean implementation within organisations, particularly SMEs.

It is worth mentioning that the Focus Groups were conducted after conducting the semi-structured interviews. During the focus groups, the process of themes becomes more structured by aggregate the aspects that affected lean implementation within SMEs, in order to validate relationships within the data.

The agenda also became more deliberate in order integrate the findings within the themes. A series of short statements referring to each of the seven themes (Communication and interaction in the organisation; Organisation's Strategy and vision; Organisation's Infrastructure of the workshop; Quality risk management; Human Resources Change management and behaviour patterns and Sustain continuous improvement) were developed with the team in focus group.

In addition, to gauge current perception of participants, an ideal position was developed for each theme from literature review and data gathering. A series of short statements relating to each of the seven themes were developed with the teams in focus groups and from literature to describe an ideal position of the required organisational culture to create a desired lean culture's ideal positions. From the ideal position for each theme a questionnaire was developed and sent out to gauge the current perception of participants. The results presented that all the themes located in a disagreement level; the questionnaire outcome showed negative sign for all themes. This variable highlights many negative aspects within SMEs that can be perceived from the low scores and are indicative that these firms are not ready for lean implementation or struggling to deal with lean implementation .

As has been discussed previously, the framework outlined in this study was based on eight interventions developed from literature review and data

gathering to facilitate lean implementation within SMEs, to enhance the eight themes developed during the research (see Table 29). The results from gauging current perception of participants shows that change management and behaviour patterns and sustained continuous improvement are perceived as being low. In addition, the participants also feel that management and leadership support and commitment for activities is low. Moreover, the influence of the owners of the firms extremely affected the entire process of lean implementation. In evaluating interventions to develop lean culture, the interventions pooled from the literature review and data gathering indicated a need to provide strong commitment, support from leadership, and managing the family influence to facilitate lean culture.

This situation is apparently considered reason for endorsement for the application by senior management of counterproductive strategies with respect to leadership style and the way in which family owners are managed within a business context. Within SMEs, any influence to implement lean processes is typically held by family owners, who frequently lack consensus support (with respect to decision-making, training, responsibilities and behaviours) to attempt the lean implementation. In addition, the findings of Reid and Adams (2001), who proposed that human resource management (HRM) strategies differed between family-run businesses and non-family-run businesses, could not be upheld by the present study.

Reid and Adams (2001) finding concurred with the results of a number of researchers who discovered variations in the way in which lean implementation are embedded within family-run versus non-family-run businesses, proposing that non-family-run firms are more likely to apply lean practices (Ellington et al., 1996; Levinson, 1987; Ward, 1988; Hofer and Charan, 1984). In particular, Ellington et al. (1996) reported that family-run businesses implemented fewer quality and management practices, as they generally displayed shorter term objectives. In addition, Ellington et al. (1996) discussed how family-run businesses exhibit greater centralisation with respect to decision-making, with the same senior managers participating in each decision. Consequently,

family-run firms struggle to take a holistic perspective with respect to management styles.

Furthermore, these results also concur with Astrachan and Kolenko (1994), who reported that family-run firms lack the skills to implement HRM practices, causing them to be at a disadvantage to non-family-run firms. Similarly, Graves and Thomas (2006) also reported better management skills displayed by non-family-run businesses. However, the current exploring could not corroborate these observations, since both types of business within the KSA were discovered to be similar in their implementation of lean practices.

Top management participation is essential for the successful embedding of lean process implementation. Such participation must be clearly visible to all staff during the intervention process. Ensuring supply of sufficient resources, nurturing talent, motivating the workforce and showing a real concern in the success or otherwise of the proposed interventions will promote eventual lean implementation. Senior management must be cautious to avoid taking control of the interventions as employees hold responsibility for implementing interventions 1 to 8. The role of senior management is to facilitate, encourage and display interest in the proceedings; however, employees must assume control and ownership for all intervention stages. This outlines the ideal framework for lean implementation: the view that investigation, knowledge acquisition and innovation are prized skills which are to describe the future motivations of the employee.

In Japan, for example, senior managers are usually keen to support lean implementation with every required resource and tend to participate enthusiastically in the whole process by themselves personally. Conversely, US senior management typically take only a partial interest in resource provision, training and process change (Inman and Mehra, 1990; Maxwell *et al.*, 1998; Koeningsaecker, 2005; Kovacheva, 2010; Moosa and Sajid, 2010). However, another challenge is now on the horizon for organisations which are willing to adopt changing management roles.

It is commonly accepted that 'Learning by Doing' is necessary to learn through experience so that process improvement skills can be firmly established and the desired aims and objectives can be achieved. Generally, organisations which were successful in their adoption of lean processes, were those which experienced the greatest challenges in persuading management to alter their ingrained attitudes. To achieve superior performance, the most significant barrier to overcome is the embedding of novel lean principles, into an integrated sequence according to particular inter-organisational parameters.

The influence of leaders and top management has been frequently identified as the most critical factor for success with lean implementation. This influence can be exhibited in a variety of ways: ensuring a transparent vision; appropriate financing and resource allocation; demonstrating strategic leadership (Tsang and Antony, 2001). To guarantee successful application of lean processes, it is vital for top managers to establish an ethos of quality by empowering their workforce (Zhang et al., 2000). This factor has been repeatedly highlighted by many researchers (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).

In addition, it has been reported that the absence of a culture of quality within SMEs is frequently due to the fact that SMEs lack suitable internal management structures such as: absence of knowledge of LI in KSA companies; absence of knowledge on the significant concerns with respect to LS for people, e.g. reward and recognition, participation, engagement, empowerment, etc; absence of capabilities to provide solutions for technical challenges as a result of shortages in appropriately skilled labour, training courses and/or rational approaches for problem-solving and process-improvement; substandard communication between senior management and the labour force; absence of appropriate communication technology to facilitate intra-department communication; and absence of senior management support and leadership. These characteristics reflecting organisational cultural norms prevent preparation for lean application within SMEs.

The results of this study corroborate the findings of several other investigators, such as Graza-Reyes et al. (2011), who report that KSA organisations may yet be too immature to fully appreciate the requirements and benefits of lean processes. The lack of application of lean processes associated with SMEs also validates the findings of Jaeger et al. (2013), who reported that the lean approach is not given appropriate consideration within the GCC area and is not implemented. The identified absence of leadership, customer priority and rational approaches for quantification and evaluation, are also supported by the findings of Jaeger et al. (2013).

Additionally, Graza-Reyes et al. (2011) also reported the absence of continuous improvement, empowerment and senior management support. Like Al-Nofal et al. (2004), they discovered lack of participation and engagement at the shop-floor level, combined with an absence of commitment to quality improvement from the senior management, absence of an ethos of quality and absence of robust customer and supplier relationships. Furthermore, SMEs were shown to be devoid of senior management commitment and leadership, a finding corroborating that of Ghobadian and Gallear (1997), who reported that SME owners and senior management are oblivious to the requirements of primary managerial responsibilities that are vital for ensuring improvements in quality. This result is also in line with the findings of Yusof and Aspinwall (1999), who outlined characteristics influencing implementation of QI in Qatari SMEs. Highlighted features included human and technical factors, resource shortages and inadequate finance.

The identified absence of training in SMEs is also in line with the findings of Antony et al (2008), who reported that financial limitations restricted training availability within SMEs. Hill and Stewart (2000) again highlighted the lack of training offered by SMEs as a consequence of financial concerns. Consequently, any training courses offered by SMEs tend to be informal and unscheduled to respond to immediate organisational needs. These findings concur with those of the current study particularly with respect to SMEs and the interviews with the 29 subjects, who articulated a lack of funding for training,

with any training received being dependent upon their organisation's latest initiative, which was considered not always to match the organisation's best, long-term interests.

Comparing the results of the present study with the findings of other researchers in developing nations revealed the presence of certain similarities: the KSA was shown to exhibit an absence of senior management commitment and support training and education; supply chain quality; employee empowerment; employee participation; and priority customer relationships. Kuwait, Palestine (Baidoun, 2004), the UAE (Badri et al., 1995), Saudi Arabia (Al-Omair, 2002) and Qatar (Al-Khalifa and Aspinwall, 2000) have all been shown to share these characteristics.

Effective lean implementation relies upon a continuous review and revision process. Correlated with this, SME proprietors / managers are advised to promote the chances of success in their lean implementation programmed by actively sourcing funding opportunities and other support from external sources, e.g. visiting other firms where succeeded to apply lean, government agencies and consultants. The ultimate success of the lean process is dependent upon acknowledgement of the workforces needs — in other words, employees must be given a voice. The commencement of any lean application drive should therefore attempt to ascertain what employees would like to say. Such an approach will ensure the organisation of SMEs lean progress based upon an accurate comprehension of employee value, which needs to be continually updated as values may evolve rapidly.

Since SMEs frequently possess a flatter hierarchical structure, involving greater informality in working relationships, this can improve rapid and direct communication between managers and employees. Consequently, it is possible that lean concepts may be more effectively transferred within an SME and thereby achieve total employee engagement.

As well as communications, workforce training is also a significant activity within any lean implementation programme. In this respect, SMEs are frequently

castigated for their lack of support for employee development, a typical prerequisite for lean programmes. To overcome this problem, SME proprietors / managers may want to assess the benefit of hiring appropriate training consultants to facilitate this element of the lean process.

Prior to commencing lean implementation, it is essential for the SME organisation to have full confidence in the quality, health and safety aspects of its procedures, components and final products. Lean systems operate by removing time and inventory contingencies and therefore demand 'right first time' processes. Where quality, health and safety aspects are not dependable, there is a consequent risk that lean implementation may cause significant disruption and fail customer expectations. Quality audits should provide detailed assessment of whether or not the SME firm is prepared to attempt the implementation of lean procedures with respect to: organisation of workshop processes; financial backing; existing human resources; staff training and motivation; and relevance of monitoring systems. The presence of any knowledge management processes operated by the SME can be utilised from the start to facilitate the subsequent lean implementation.

Organisation size does not appear to significantly affect the target lean culture; both large and small organisations were assessed to possess similar quality and management practices, corroborating the findings of Mallur et al. (2011), but contradicting those of Mady (2009), who proposed significant differences between small and medium-sized organisations within Middle East, concluding that medium-sized organisations were better at implementing lean processes. Mady (2009) additionally showed significant variations in customer focus between large and small organisations, particularly with respect to process quality. He argued that medium-sized organisations are better at benchmarking, process improvement and data-based decision-making.

Findings highlighted the absence of significant variations between the six main industrial sectors: steel manufacturing; electric manufacturing; oil manufacturing; paper manufacturing; packaging manufacturing; and construction manufacturing. This was particularly the case with respect to the

application of lean implementation procedures, as the perceived rating for all six sectors was practically identical, with none as yet demonstrating significant success with lean implementation. This finding concurs with Mady (2008), who described negligible variations between the various main industrial sectors within the KSA and individual regions with respect to perceived competitiveness priorities, including adaptability, on-schedule delivery, cost minimisation, innovation and quality improvement. One underlying reason for these underlying observations could be low competitiveness with the market, resulting in the majority of industry types merely providing for local markets. However, these observations have not been reported by other investigators (Reed et al., 1996; Corbett and Rastrick, 2000; Curkovic et al. 2000) who argued that the various sectors employed various alternative quality and management approaches.

In addition, this finding does not concur with Mady (2009), who observed a variation between the quality and management approaches employed by different industry sectors in KSA and the surrounding region. Mady (2009) concentrated on just two sectors (including food), whilst the present study evaluated six different industrial sectors (not including food). Ab-Rahman et al. (2011) again did not report similarities of practice between different sectors within Libyan manufacturing industries. Paksoy et al. (2011) was another author reporting variations with respect to perceived Total Quality Management (TQM) within four sectors (iron-steel, automobile, textile and plastic); highlighting that the iron–steel industry demonstrated the most significant TQM abietites, whilst the textile industry was identified as the worst-performing industry.

Results reported by Taj (2008) were also not supported by the present study; he observed a variation with respect to implementation of lean practice between different industrial sectors in China (electronics, telecommunication, wireless, computer, food/beverage, garment, pharmaceutical, chemical, petroleum, printing, A/C and heating). Similarly, Taj (2005, 2008) observed that the petroleum industry outpaced all other sectors with respect to lean

implementation, followed by computer, telecommunication/wireless, electronics, garment, food and beverages, pharmaceutical, printing, and A/C and heating industries, respectively. As explained in Chapter 4, sector is not emphasised as a variable factor influencing lean implementation, since it is believed by many authors that lean implementation is applicable to the whole variety of industrial sectors (Womack et al., 1990; Soriano-Meier and Forrester, 2002). In addition, as this exploring is the first to address lean implementation within the KSA, it is therefore a requirement to construct a solid foundation from which to derive an improved comprehension of KSA businesses. Therefore, sector observations are not comparable with sectors addressed in earlier reports.

It has been identified that developing nations require a framework to promote lean implementation process for SMEs (Safety and Executive, 2008; Karim *et al.*, 2011; Al-Najem, Dhakal and Bennett, 2012; AL-Najem *et al.*, 2013; Al-najem, 2014; Albliwi *et al.*, 2014b, 2017; Alkhoraif and McLaughlin, 2017; Alkhoraif and McLaughlin, 2018b, 2018c). In addition, many investigators have identified the significance of such a framework prior to attempting lean implementation (Nordin et al., 2012a; Radnor et al., 2006). The present report addresses this challenge by constructing a foundation framework which enables lean implementation by outlining the majority of requirements for lean interventions that have been identified by a review of published literature and data-gathering. The framework proposed is basic and simple to employ, permitting managers to more easily comprehend their current strategies and determine whether or not they are currently support implementation of lean processes, or whether additional issues require to be addressed prior to implementation. Such an approach will facilitate managers understanding of whether they already possess the necessary resources for lean implementation, and also to assess whether or not they are able to meet the expense associated with such interventions.

Should managers be unwilling to address the necessary requirements, probabilities of success in lean implementation are likely to be severely diminished, since lean implementation is dependent upon all interventions

previously listed. The framework is not restricted to application within the KSA, as it was formulated from a variety of investigations from around the globe, with the majority of factors being applicable to every kind of manufacturing sector. Additionally, since most Arab nations – particularly those in the GCC area – possess similar cultures and values, the outcomes can be generalised to these nations, since lean implementation will depend upon particular of cultural settings, in both organisational and national respects (Al-Najem, Dhakal and Bennett, 2012; Al-najem, 2014; Alkhoraif and McLaughlin, 2018b).

The results of the present study demonstrate that the key criteria restricting Saudi Arabia SMEs from implementing lean practices include: the influence of family proprietors within decision-making processes; the dedication of senior management to achieving lean implementation; as well as a variety of other factors including national wealth and dependency upon expatriates. It is considered that the results are directly applicable to other Arab nations, particularly those within the GCC area. Gherbal et al. (2012) reported that Libyan industries are implementing TQM approaches merely for prestige, rather than to achieve tangible commercial improvements. In addition, Jaber (2010) identified that favouritism is influencing Libyan preparedness for TQM implementation. Bardot (2013) described how the majority of GCC nations are keen to enhance their commercial viability and are making significant attempts to implement optimum solutions, but do not comprehend what such solutions entail and cannot ascertain how or where to begin. The previously identified framework could offer one approach here to assist manufacturing sector SMEs. Therefore, the results of this study can provide a guide for the GCC nations, particularly for small, local organisations and government groups not involved with partnerships with Western organisations. Bardot (2013) proposed the requirement for intensive training to promote the acceptance of latest approaches within GCC nations. Additionally, the framework may be useful for any manufacturing sector, irrespective of location, since it consists of key foundational stages of lean implementation. Therefore, any organisations wishing to implement a lean system can employ this framework to enhance lean

implementation if they possess a similar social setting as the organisations reviewed in this investigation.

To assist in cutting its dependency on fossil fuels, the Saudi Arabia government is helping its SME manufacturing sector by instigating a 2030 vision road map to assist in achieving the envisioned goals. Therefore, to promote successful lean implementation and to increase the part played by SMEs, the government must address this specific sector by promoting adoption of the proposed framework and raising awareness campaigns to emphasise the significance of this framework, whilst elucidating the factors required for successful implementation. This can be achieved by offering SMEs suitable training. Study results highlight the inherent weaknesses of SMEs in KSA and also the necessity for the framework to promote lean implementation, so that the framework can be employed by the KSA government to generate action points to achieve the desired direction.

Potential lean manufacturing users can make informed decisions on the overall economic viability of its adoption at an early stage. Companies may also strategize the framework adoption based on factors such as cost, readiness, benefit analysis and risk assessment. Experts inference reiterated that the framework can be better used in the facilitation of lean culture, to help implement lean; this would be a catalyst in a given company.

6.3 Making the change

Data-gathering and the published literature indicates a clear need for robust senior management commitment and careful consideration to manage the influence of family owners. During the interview phase of the study, interview subjects expressed concerns regarding the influence wielded by family firm proprietors in the business process and also the level of real commitment of senior management for lean culture implementation. Additionally, assessment values for Stage Two (as depicted in Figure 4-5) highlight the consequences of unsatisfactory change management and behaviour patterns, sustain continuous improvement element and organisational strategy and vision.

Data-gathering reveals that subjects highlighted the existence of some resistance by senior managers, leadership and family firm proprietors to attempt changes in process methods. Under such circumstances, it might be expected that if employees wish to be guided by management, they might wish to take measures to ameliorate the current status quo, whilst being suspicious of transgressing established and familiar behaviour patterns, particularly if these involve a sequence of interventions demanding alternative behaviour patterns. Proposed interventions for enhancing various parameters of a lean implementation—supporting ethos within SMEs is significantly reliant upon family firm proprietors and senior management support. A vital element of this support is the development of a strategy with a vision for the organisations (Malik et al., 2007; Nordin et al., 2012). Such a strategy performs as a model for the desired position following the interventions.

According to a review of the published literature, data-gathering activities and results from investigations of a number of companies that were subject to change initiatives, a great number of various interventions are proposed (Lucey, Bateman and Hines, 2004; Achanga et al., 2006b; Yogesh, M., Chandramohan, G. and Arraka, 2012; AL-Najem et al., 2013; Shokri, Waring and Nabhani, 2016; Albliwi et al., 2017). They all consist of a common thread highlighting the factors of lean culture affected. The probability of generating the desired culture is enhanced by evaluating a suitable group of interventions which aim to alter the behaviour of team members, and subsequently reinforcing that behaviour so that it becomes integrated within the ethos underpinning the group (Schein, 1991).

A number of researchers have described how the success of a small firm or SME can be correlated to how effectively knowledge is managed within the organisation (Dollinger, 1984; Brush, 1992; Brush and Vanderwerf, 1992). Knowledge can be variously defined as expertise, know-how, skills, tradecrafts, ideas, intuitions, and insights. Management of knowledge has been demonstrated to be a significant contributor to organisational success at the strategic level (Nonaka and Takeuchi, 1996; Davenport and Prusak, 1998;

Desouza and Awazu, 2006). Companies successful in utilising knowledge effectively, typically experience: enhanced communication; optimised strategy and vision; efficiency improvements in operations; improved success rates with respect to innovation; improved customer satisfaction; and an improved capability to forecast market trends. In addition to the conventional approaches for knowledge management, SMEs carefully consider knowledge management for a variety of other pertinent factors. SMEs have an advantage in their ability to construct robust infrastructures for knowledge management systems as a consequence of their abilities to quickly utilise resources, whilst larger companies might allocate excessive resources to constructing, managing and developing technological approaches for knowledge management (Desouza and Awazu, 2006)

Recruitment and selection intervention represents one of the key HRM processes with the strongest impact on lean implementation (Yang, 2006). A robust organisational ethos consisting of shared core values has been highlighted as of key significance for successful lean implementation. An HR activity which has become a focus over the last few years is employee selection. This has become of greater and greater significance in the list of key HR activities (Buchanan et al., 2007; Leat and El-Kot, 2007; Su and Yang, 2015). A variety of critical HRM levers have been utilised, however, observing recruitment and selection tasks as integrated key activities for businesses has been a primary consideration. Recruitment strategies conceived by recruitment management teams typically depends upon cutting through current recruitment approaches with specific quality/quantity targets at an appropriate timeframe. The aim of such enhancement is to meet the hiring goals of the HR plan in a timely fashion (Macduffie, 1995; Yew Wong, 2005; Ismail Salaheldin, 2009; Arshida, 2012; Hietschold, Reinhardt and Gurtner, 2014; Lande, Shrivastava and Seth, 2016).

An appropriate environment promoting suitable health and safety awareness will enhance organisational infrastructure and improve quality inspection results by ensuring that all requirements (such as approaches to address accidents and emergencies, including satisfactory first-aid arrangements; provision of

suitable personal protective clothing and equipment with no expense incurred by the worker) are made available in a timely fashion (Hsa, 2006; Alli, 2008; Longoni et al., 2013). In addition to this, applying feedback system the quality of the inspection employee suggestions, employee needs, infrastructure of the workshop and close the gap between the employee and the top management (Tsang and Antony, 2001; Folkman, 2010; Levinson, 2011; Godinho Filho, Ganga and Gunasekaran, 2016; McLean, Antony and Dahlgaard, 2017).

Education and training is the most significant factor effecting the journey of lean implementation. Studies of employee needs help employers identify where HR interventions may be appropriate (Wright and McMahan, 1992; Macduffie, 1995; Bhasin and Burcher, 2006; Leat and El-Kot, 2007; Ali, 2010; Su and Yang, 2015; Laureani and Antony, 2016b). Also, training and education can change employee attitudes and their behaviour by increasing their knowledge, and will affect positively the sustainability of continuous improvement, an essential step. The training program should be part of the quality policy where the responsibilities, organisation, needs, monitoring and assessing of results are essential in the improvement cycle (Yew Wong, 2005; Achanga et al., 2006c; Stanleigh, 2008; Jeyaraman and Kee Teo, 2010; Arshida, 2012; Desai, Antony and Patel, 2012; Deros, 2014; Laureani and Antony, 2016b; Albliwi et al., 2017). In addition, hiring experts to train and improve the work will enhance the sustain of continuous improvement by involving consultants and improving training among the employee (Nofal, Omair and Zairi, 2005; Achanga et al., 2006c; Salem et al., 2006; Barisic and Bozicevic, 2013; Al-najem, 2014; Mohamed Aichouni, Nouredine Ait Messaoudene, 2014).

Once the commitment from top management is present, quality training should be continuously performed, providing the intervention required from top management and the leadership's commitment to be demonstrated in the form of developing clear vision, ensuring sufficient financial resources, implement database system, external and internal support, feedback system and providing strategic leadership (Tsang and Antony, 2001; DeTienne and Koberg, 2002; Achanga et al., 2006c; Nordin et al., 2012; Albliwi et al., 2014b; Lam and

Rahma, 2014; Asnan, Nordin and Othman, 2015). Deflorin and Scherrer-Rathje (2011) concluded that excessive level of management commitment is characterised via credibility, consistency, and support. Lack of commitment might also lead to problems such as restricted access to resources, unusual postponement in decision-making process, and ineffective procedure of communication (Kundu and Manohar, 2012). These perspectives are in line with the research literature and data gathering, which has totally emphasised the importance of top management commitment and support in adopting lean successfully (Achanga et al. 2006; Barraza and Ramis-Pujol, 2010; Coronado and Antony 2002; Crute et al. 2003; Dora et al. 2012; Scherrer-Rathje et al. 2009; Timans et al. 2012). Top management should appreciate employees' efforts and work to create interest in the implementation and make the change to all employee in the firm. Scherrer-Rathje et al. 2009 stated that in the absence of management commitment employees may not realise the importance of lean systems, which in turn lead to employee not being totally interested in lean efforts, negatively contributing to the lean success.

6.4 Chapter summary

This chapter presents a discussion of the results acquired from the various data sources: questionnaires; semi-structured interviews; observations; focus group; and the framework. Particular reference is made as to whether such sources are in agreement with sources utilised by other investigators and explorer. Primary results indicate that SMEs are experiencing difficulties with lean implementation, as a result of internal factors detrimentally influencing success. This thesis also identified deficiencies in training and recognition, noting that SMEs are not implementing rational approaches to address challenges and enhance processes. In addition, acknowledgement and comprehension of the advantages and principles of lean approaches have been observed to be lacking, with experience of lean implementation absent in SMEs. In addition, it has been reported that the absence of a culture of quality within SMEs is frequently due to the fact that SMEs lack suitable internal management structures such as: absence of knowledge of LI in KSA companies; absence of

knowledge on the significant concerns with respect to LS for people, e.g. reward and recognition, participation, engagement, empowerment, etc; absence of capabilities to provide solutions for technical challenges as a result of shortages in appropriately skilled labour, training courses and/or rational approaches for problem-solving and process-improvement; substandard communication between senior management and the labour force; absence of appropriate communication technology to facilitate intra-department communication; and absence of senior management support and leadership. These characteristics reflecting organisational cultural norms prevent preparation for lean application within SMEs.

This chapter will also address the development of the framework approach. The research implemented led to the development of a framework to promote lean implementation within the SME manufacturing sector. The framework is sufficiently well-structured and comprehensive to be easily comprehensible to potential users. Furthermore, the framework addresses primary enablers, parameters for the successful application of lean processes within SMEs, in addition to, the significant barriers which may hinder lean implementation. The framework emphasises all relevant stages which are essential for consideration during the implementation process. The framework can be employed as a guide for manufacturing organisations with an objective of promoting lean culture. Furthermore, the chapter addresses potential beneficial changes for SMEs within the manufacturing sector. Lastly, the chapter identifies limitations associated with this study and recommendations for future research.

7 Chapter 7: Conclusion

The intended objective of this research was to develop a framework to facilitate lean implementation within small and medium enterprise (SME) manufacturing organisations in Saudi Arabia by leveraging aspects of Organisational Culture. In Stage One, the research took a grounded theory approach, conducting semi-structured interviews with employees of SMEs. Data from semi-structured interviews were analysed. In addition, focus groups were conducted to develop a series of aspects and develop themes. Seven themes were identified that represented aspects of lean culture that related to lean implementation, these themes were developed through focus group activity.

In Stage Two, grounded research results from Stage One were triangulated. Additionally, an assessment of the extant position of the SMEs participant's lean culture in improving lean implementation was provided. This provided an initiating point for developing a framework of interventions appropriate for moving the organisational culture to be more upholding of lean implementation.

Stage Three proposed a series of interventions that were suitable for SMEs, a series of interventions to which a literature review was again related for appropriate intervention. The interventions recognized from data gathering and literature were assessed from the perspective of being related to changing the SMEs lean culture. A key aspect of the interventions are the top management commitment and role of the family member. This leadership from the top of the firm is vital to ensure resources and support for lean implementation are made available, but more important is managing the influences of the family owners. That framework was validated through expert evaluation the output from the research project.

The goal of this chapter is to show how the aim and objectives of this research, defined in Chapter 1, have been accomplished. The main objectives achieved are outlined in Table 7-1 below.

Table 7-1 Research objectives (source: by author)

Object	How it has been achieved
Analyses Organisational culture enablers and inhibitors of Lean implementation, through a literature review	The essential factors were identified by reviewing the research literature; the researcher could extract and address the critical enablers and inhibitors.
Investigate, via a field study, the Organisational culture enablers and inhibitors for Lean in Saudi Arabian SMEs in the manufacturing sector	In order to investigate of KSA SMEs manufacturing sector towards LI, there was a need to understand and identify several issues, such as the general state of SMEs in terms of their contribution towards the aspects of effecting lean implementation, and the lean adopted by those firms, as well as identifying the factors that are inhibiting their potential to compete with world-class organisations by conducting semi-structure interview, focus group activities and observation. Develop an assessment to gauge the participants' perception in terms of lean culture ideal position.
Develop a framework to develop an Organisational culture that supports Lean implementation within Saudi Arabian manufacturing SMEs	In order to develop framework to help achieve the aim of this research, there was a need to reviewed literature highlighted many of the interventions. suggested a series of interventions that were suitable for SMEs, a series of interventions literature review was again related for appropriate intervention and compare contrast with literature, data gathering was blind then with literature review then conflated as a word use literature and data gathering to develop a series of intervention to facilitate lean in terms of developing aspects of a lean culture. So, the out of this research was a framework.
To validate the developed framework.	That framework was validated throw expert process. The researcher used an expert judgment for this research.

7.1 Review of the research questions

This section presents the research questions relevant to this exploratory study (see Table 7-2). The questions are assessed in the context of the research undertaken. The primary research question was replaced by two sub-questions representing different phases of the research process. A concise response to the research question is summarised in Table 7-2 with the response to sub-questions summarised in Table 7-3.

Table 7-2 Research question and review informed from the research (source: by author)

Research question	Review
<p><i>‘ What aspects of Organisational culture facilitate Lean implementation in manufacturing small and medium enterprises and how can these aspects be leveraged to improve Lean implementation?’</i></p>	<p>The identified aspects fall into seven themes. The framework for which can be viewed as representing basic archetypes of lean culture, offering a transparent indication of the aspects of organisational culture important in influencing lean implementation.</p> <p>The production of a framework addressing planned interventions for SMEs within the manufacturing sector in Saudi Arabia, constitutes the second section of the question. Interventions are developed with reference to published literature and data-gathering approaches with the ideal position for lean culture as desired end-point</p>

Table 7-3 Sub-questions and review informed from the research (source: by author)

Sub question	Review
<p>What are the Organisational culture enablers and inhibitors to Lean Implementation in small and medium sized manufacturing firms?</p>	<p>The enablers and inhibitors for lean culture are identified via a review of published literature and data-gathering processes. Such enablers and inhibitors constitute the foundation for the development of the ideal lean culture developed</p>
<p><i>What are the interventions of organisational culture that can improve Lean adoption in KSA?</i></p>	<p>A programme of change constituted by a sequence of interventions is suggested. The proposed interventions are derived from the published literature and experiences of identified organisations. The interventions are progressed with the aim of implementing the ideal lean culture position for the identified organisations. This ideal position emphasises key aspects of a lean culture. The interventions are designed to move the organisation's underpinning values and beliefs, toward a more desired position, via the application of appropriate techniques</p>

7.2 Contribution to the knowledge

Contribution to the knowledge, academic contribution, evaluation of causes of failure of implementing Lean Philosophy in SMEs in Saudi Arabia, identifying the OC aspects for SMEs in Saudi Arabia to implement Lean philosophy and filling the literature gap in LI for SMEs where regions of developing countries are considered. (Alkhoraif and McLaughlin, 2018b). This study is expected to make a significant contribution to furthering knowledge regarding lean implementation. Since little is currently known regarding lean implementation by

promotion of specific aspects of organisational culture within the Kingdom of Saudi Arabia, this exploratory offers a novel approach by highlighting parameters which act as obstacles for lean implementation for KSA SMEs. Furthermore, there is an acknowledged absence of research relating to lean implementation for SMEs, particularly with respect to the Arab world. This exploratory is expected to further knowledge of lean systems, and thereby contribute to research literature addressing SME lean implementation in the developing nation context, particularly relating to the Arab world. Since Arab countries share many cultural and other characteristics, it is envisaged that the results of this investigation will be applicable for establishing frameworks in other Arab nations. This study also furthers knowledge on how lean implementation can fail. Various investigators have reported the significant number of lean implementation failures, despite the prospective benefits at stake (Ballé, 2005; T. C. Papadopoulou and Özbayrak, 2005; Emilliani, 2008). Fully comprehending an organisation's capability to take on board lean measures, and to fully comprehend the associated requirements for these, constitute important considerations for preventing failure. The framework produced by this exploratory will enable companies to assess their capabilities prior to trying a lean implementation journey. The framework is also envisaged to create an ethos which facilitates lean culture implementation and promotes comprehension of the requirements demanded by the framework.

Furthermore, this study furthers knowledge relating to aspects of organisational culture likely to promote lean implementation. This knowledge is multidisciplinary and contributes to the fields of lean implementation, organisational ethos and lean culture. The researcher has utilised a grounded participative approach, within actual SME manufacturing sector teams to reveal primary influences affecting establishment of lean culture. This research can therefore be viewed as a live exploratory technique to further desired organisational development. This technique contributes to the theoretical knowledge base of organisational development for transformational change, and since the research is participative, it has significant potential for developing theory with practical relevance (Huxham and Vangen, 2003). This participative

technique for knowledge development relating to participants perspectives on lean culture and on determination of lean implementation capability from an insider's viewpoint, furthers framework development. Additionally, as a consequence of the variety of data-collection sources employed, this exploratory has contributed novel insights regarding the barriers encountered by SMEs in lean implementation and identified the origin of such barriers. Lastly, the framework is an entirely new approach within the literature, promoting lean implementation by promoting aspects of organisational culture relevant to SMEs and therefore represents a unique approach to lean implementation.

This exploratory involves research relating to actions of insider participants. Consequently, this has influenced the responses of participants to interviews, focus group sessions and discussions on the research tasks. The adopted approach employed triangulation by utilising established assessment tools in addition to a journal kept by the researcher as an approach to validating developments in participative team work. Such insider participative action research is fairly unique. The methodological approach to this exploratory necessitated experiential participation by the researcher, lack of *a priori* analytical classifications and an objective to comprehend a specified situation (Evered and Louis, 1981). The triangulation of the results derived from a grounded approach via observations and assessments which contributed to the validity of the final framework. This adopted approach may have applicability to other situations where the exploratory, in the role of practitioner, possesses similar opportunities to influence research participants responses. This form of action research thereby makes a significant contribution to the overall analytical methodology.

7.3 Recommendation

In order to ensure the success of Lean, SMEs needs to pay attention to organisational culture to adopt Lean, and developing awareness campaigns that highlight the importance of Lean and explain the requirements for the implementation process. The findings of this study show the weaknesses SMEs and the requirements for Lean. Thus, Top management participation is

essential for the successful embedding of lean process implementation. Ensuring supply of sufficient resources, nurturing talent, motivating the workforce and showing a real concern in the success. Education and training is the most significant factor effecting the journey of lean implementation to be successful. Also, An appropriate environment promoting suitable health and safety awareness will enhance organisational infrastructure and improve quality inspection results by ensuring that all requirements. Moreover, Managing family influences within firm is essential.

The final recommendation is to the leadership of industrial companies seeking to implement lean or those who are embarked on the lean journey and is a recommendation that the company stay focused on their lean journey. A company's vision and mission statement should make it clear that customers are a key focus and that this focus runs through the entire company, top down. As has been evidenced in this study, this focus on understanding that engaged employees support this focus is a victory for the leadership of successful firms and a path the company should continue on.

7.4 Practitioner contribution

It is envisaged that the exploratory results will be useful to practitioners in assisting comprehension of aspects of organisational culture which aid lean implementation. Introduction of an implementation framework of cultural aspects will promote lean implementation within Saudi SME manufacturing companies. Furthermore, the framework which influences lean implementation can be generalised to situations outside the specific context of SMEs in Saudi Arabia to a certain extent. The framework represents factors of organisational culture which are influential to lean implementation. The framework represents a potential starting template for assessing other companies lean cultures. Whilst the research is specific to SMEs, there are aspects which may be relevant to other SMEs experiencing difficulties implementing lean culture. As Parker states (2000: 222), 'all organisational cultures are unique, yet at the same time they share similar features'.

Developing abilities with respect to lean implementation is of increasing interest to organisations. The framework proposed within this exploratory is designed to facilitate lean culture development to promote lean implementation. The framework is founded on empirical examples and aims to minimise the existing deficiency between current and desired level of lean culture implementation. Hagardon (2003) has described the aim as identifying the current status of lean culture, the desired status and how to traverse from one state to the other. Therefore, the practitioner contribution is what lean culture 'look like' and 'how to get there'.

This research furthers knowledge development in the context of lean implementation within SMEs in the manufacturing sector, by producing a framework to create a lean culture within a larger incremental culture. Furthermore, the results of this expletory are particularly relevant to SMEs in KSA, since they are based upon many interviews with KSA companies aiming to identify causes for problems associated with lean implementation. Consequently, this means that a general perspective for SMEs was acquired, rather than data relevant to only those firms visited. Furthermore, the framework aims to assist SMEs practitioners to conduct impact assessments associated with lean manufacturing implementation during the early application phase. Table 8-4 below summarises relevant areas of contribution.

Table 7-4 Contributions of the research (source: by author)

	What has been confirmed?	What has been developed?	What has been found which is brand new?
Theoretical Knowledge Empirical	<ul style="list-style-type: none"> • Family influence on developing a lean culture. • Top management influence on developing a lean culture. 	<ul style="list-style-type: none"> • Framework to facilitate lean implementation • Interventions suitable to develop lean culture in SMEs firms. 	<ul style="list-style-type: none"> • A framework to organisational development for transformational change
Empirical evidence	<ul style="list-style-type: none"> • Aspects of organisational culture that influence lean implementation within SMEs 	<ul style="list-style-type: none"> • Themes developed through participative inquiry. • Themes that influence lean 	<ul style="list-style-type: none"> • Development of an instrument to allow self-assessment to gauge a participants' position against an ideal position
Methodological approaches	<ul style="list-style-type: none"> • Content analysis • Grounded theory • Action research • Triangulation using different methods. 	<ul style="list-style-type: none"> • Gauge for presence and intensity of a lean culture. 	<ul style="list-style-type: none"> • Unusual participatory research by participant for all level of the business.
Knowledge of practice	<ul style="list-style-type: none"> • framework suitable for facilitating lean implementation 	<ul style="list-style-type: none"> • Strategic plan to develop lean culture in SMEs. 	<ul style="list-style-type: none"> • what lean culture 'looks like' and 'how to get there

7.5 Limitation of the research

Generally, the results from this study are limited to SMEs, since only predominantly SMEs within the KSA were exploring with the exclusion of larger organisations. The small sample size represents another limitation of this research; difficulties were experienced persuading a greater number of organisations to take and part and it was not possible to cover the entire KSA manufacturing sector because of time restrictions, their lack of concern, and also because not all firms matched the requisite SME criteria. The absence of data and published reports on KSA manufacturing industries represented additional limitations to the study, as well as the lack of research on lean implementation within GCC nations, since this prevented comparisons between the results of other investigators. This study involved a semi-structured interview procedure in addition to other data collection approaches. Although it is acknowledged that semi-structured interviews and focus group activities can result in bias, a variety of approaches were implemented to minimise bias effects. Also, the use of a questionnaire in this study could represent inaccuracies if the respondent's answers were not entirely accurate: for example, some subjects may not have been interested in the topic under exploring and may merely have made up answers to the questionnaire as a favour or out of politeness. However, by applying various techniques, it is considered that an accurate representation of SMEs has been acquired – although this cannot be known for certain. Furthermore, the questionnaire which was compiled was founded on seven themes with internal validity. This approach to assessment was not intended as a robustly dependable, externally valid evaluation of lean culture. The aim was to acquire an approximation of the team's views on lean culture relative to an ideal position.

The topics of concern that have arisen from Stage 1 of the exploring relate to the elements of organisational ethos associated with lean implementation. As such, they should not be considered to represent representation of SME organisational culture in its entirety. Such themes do not occur as disparate elements, but coexist as representations of the lean-enabling or lean-inhibiting

ethos within SMEs. The information collated relates to lean implementation, but cannot be viewed as exhaustive.

The decision to stop any additional refining of themes was taken following the delivery of two workshops. Although additional opportunity to more specifically refine the themes was then lost, the dynamic viewpoint of the relevant organisational cultures indicated that lingering on data refinement compiled via a grounded methodology loses value with time. The ethos underpinning an organisation is continuously evolving, as artefacts, values and underlying belief systems cross in their influences. Since the nature of this exploring was extremely participative, with discussions on lean implementation and engagement of subjects in perspective refinement early in the process, emergence of relevant views also took place at an early stage. As the study progressed, the participatory nature of the study itself influenced the underpinning values and beliefs, thereby altering the lean culture. Too great an emphasis on introspection was viewed more likely to produce a more outdated and therefore less valid perspective.

Literature searches and data-gathering were assessed according to relevance to altering the participants' lean culture via an identified framework. The proposed framework is entirely dependent upon this research, although its basis is rooted in general management. However, the framework exploring should not be viewed as exhaustive, merely highlighting aspects potentially desired from lean culture implementation. These aspects act synergistically to exert impacts on the lean culture of the group, but cannot be viewed to perform independently of each other. Additional interventions are also likely to act to promote the desired culture. The effect of applying the interventions identified for SMEs to another business would depend upon the existing status of the lean culture within that organisation. The proposed framework may be applicable to some other mature SMEs businesses, but it would be wise to assess the various aspects which may be preventing lean implementation within these businesses prior to proposing appropriate solutions. Nevertheless, some of the findings outlined in this study may be of value to similar businesses experiencing

difficulties with lean implementation capabilities. Additional research is needed to assess the wider applicability of the suggested framework. Furthermore, as a consequence of time restrictions, application of the framework to SMEs already in the process of implementing lean practice, could not be assessed. To conclude, the results from this exploring are limited with respect to the generalisability, as the investigation predominantly evaluated SMEs within the KSA manufacturing sector and specifically excluded businesses from any other sector, such as the services or food sectors.

7.6 Future research

As a consequence of its exploratory nature, this report emphasises several additional areas worthy of further research. Initially, however, the framework should prove its worth with respect to successful lean implementation within SMEs to demonstrate its validity. Primarily, the most significant opportunity for additional research is the framework to be tested in a real environment. In noting the effect of the framework over time on the progression of lean culture. This present exploring has not addressed all manufacturing sectors within the KSA, consequently, it may be worthwhile to consider wider application to other sectors such as: food and beverages; textiles, clothing and leather; wood and wood products; and furniture. Repeating this study, but with a greater sample size could be an additional approach to ensure acquisition of more representative results. To construct a theory data analysis must relate directly to data collection. This kind of exploring results in large quantities of detailed information. Eisenhardt (1989) has reported how forced comparisons can lead to the evolution of novel categories and concepts. Contrasting this exploring with similar investigations in other mature small businesses could enable additional comparisons to be drawn from a wider data spectrum. Additionally, Arab nations within the GCC area possess many common values, traditions and cultural norms with Saudi Arabia, therefore identifying appropriate lean implementation approaches for organisations within these nations could contribute significant richness to the literature on lean implementation. Furthermore, future research is required to explore the influence of senior

management over a spectrum of KSA organisations to elucidate reasons for the absence of commitment and support for successful lean implementation. Additionally, the influence of family owners should be explored to assess this impact on successful lean implementation.

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APPENDICES

Appendix A Translation of interviews

<p>Actually, sometimes we face troubles regarding the communication issue. For instance, the department we are trying to reach with are not answering the phone calls, also there is no active reply via formal letters and emails. It is waste of time!</p>	<p>في الواقع وفي بعض الأحيان نواجه مشاكل فيما يتعلق بقضية الاتصالات. على سبيل المثال، هناك قسم نحاول التواصل معه ولا يوجد رد على المكالمات الهاتفية، وأيضا لا يكون هناك رد فعال عبر الخطابات الرسمية! أو البريد الإلكتروني. يالها من مضيعة للوقت</p>
<p>In my opinion, not using the updated communication channels makes a gap between the employees to follow up the work cycle.</p>	<p>في رأيي، عدم استخدام قنوات الاتصال الحديثه خلقت فجوة بين الموظفين في متابعة دورة العمل</p>
<p>I don't know how to use the email even the computer to communicate, I only use the mobile to call the others. Truly and always there is no answers at all from them.</p>	<p>أنا لا أعرف كيفية استخدام البريد الإلكتروني وحتى الكمبيوتر في التواصل، أنا فقط استخدم الهاتف المحمول للاتصال بالآخرين. وفي الحقيقة ودائما لا يوجد هناك أي رد منهم</p>
<p>I have multi tasks or steps to apply in a procedure at once.</p>	<p>لدي مهام وخطوات متعددة لتطبيقها كإجراء في وقت واحد</p>
<p>The supervisor only threw the orders on me to fulfil, at the same time I don't know from where to start!</p>	<p>المشرف فقط يرمي الاوامر علي لتنفيذها، وفي نفس الوقت أنا لا أعرف من أين ابدا</p>
<p>The orders which comes from the supervisors and the management, comes generally through conversations, or specifically from the mouth (he said) in which becomes really complicated and not documented, and that considered from the reasons of the lack credibility in applying the methodology in an organization</p>	<p>الاورامر التي تأتي من المشرفين والإدارة، تأتي عادة من خلال المحادثات، أو على وجه التحديد من الفم (قيل وقال) التي تصبح معقدة جدا، ولا يتم توثيقها، وهذا من اسباب نقص المصداقيه في تطبيق المنهجية في المنظمة</p>
<p>One of the important thing is the safety</p>	<p>من احد الاهميات هي إجراءات الأمن والسلامة، وأنا لا</p>

<p>and security procedures, I don't remember that it had done an evacuation plan or even a first aid courses. Do you know that there is no emergency exists in case of fire, moreover, there is only one exist for the employees' entrance and dismiss from the work?</p>	<p>اذكر مرة أنه تم تفعيل لخطة الإخلاء أو حتى اقامة دورة اسعافات اوليه. هل تعلم أنه لا يوجد مخرج للطوارئ في حالة نشوب حريق، واضف على ذلك انه يوجد فقط مدخل واحد لدخول و خروج الموظفين من العمل.</p>
<p>Do you believe that I'm working with a machine that could cut my hand and I wasn't provided with some specialized gloves for that !!</p>	<p>هل تصدق أنني أعمل مع آلة من الممكن أن تقطع يدي وأنا لم ازود بقفازات خاصة لذلك</p>
<p>There are no specialized places for the smokers, also for the wasted materials to be recycled in the organization.</p>	<p>لا توجد أماكن متخصصة للمدخنين، و أيضا للمواد المهتره لإعادة تدويرها في المنظمة.</p>
<p>It is assumed that at every week end, the quality inspector visit all the operations positions to examine the quality of the work environment and check the needs and requirements of the work, but do you believe that he only blabber and he comes only once in a month!</p>	<p>من المفترض أنه في كل نهاية أسبوع، يقوم مفتش الجودة بزيارة جميع مواقع العمليات لفحص جودة بيئة العمل والتحقق من احتياجات ومتطلبات العمل، ولكنه فقط يثرثر و يأتي فقط مرة واحدة في الشهر</p>
<p>Actually, who else you can negotiate regarding the safety and security equipment, the one who is responsible for the quality is always absent and not existed!</p>	<p>في الواقع من غيره يمكنك التفاوض معه بخصوص معدات الأمن والسلامة، فإن المسؤول عن الجودة دائما غائب و لا وجود</p>
<p>Some of the employees who works with us who are medium efficiency don't know the basic principles of the word of Lean.</p>	<p>بعض الموظفين الذين يعملون معنا من اصحاب الكفاءة المتوسطة ولا يعرفون المبادئ الأساسية لكلمة الانسيابية.</p>
<p>I took a course about the Kaizen concept for only one day and I didn't have enough knowledge about it.</p>	<p>حضرت دورة في مفهوم الكايزن لمدة يوم واحد فقط. ولم يكن لدي من المعرفة ما يكفي حول هذا الموضوع</p>
<p>There are no updated standers to train or coach the concept of Lean.</p>	<p>لا يوجد أي معايير محدثة لتدريب مبدأ الانسيابية</p>

<p><i>I never ever get into a training from a professional organization.</i></p>	<p>انا لم احصل ابدا قط على تدريب من منظمة مهنية</p>
<p><i>I do not know from where I get the instruction from! Is it from the supervisor or from the manager of the industrial department or from the general manager of the factory!</i></p>	<p>انا لا اعرف من اين احصل على التعليمات من ! هل هي من المشرف او من مدير القسم الصناعي او من مدير المصنع العام !</p>
<p><i>I'm always in confusion with the supervisors... I have a story, I'm under a supervisor from a certain nationality, and there is another supervisor from a different department who always calls me and casts his instructions without returning to my direct supervisor which makes me in duplication.</i></p>	<p>انا دائما في حيرة من امري مع المشرفين ... لدي قصة , انا تحت اشراف مشرف من جنسية معينه، وهناك مشرف آخر من قسم آخر حيث يتصل بي دائما ويلقي او امره علي دون الرجوع الي مشرفي المباشر ، وذلك مما يجعلني في ازدواجية متعبة .</p>
<p><i>I was in a meeting last week with the chairman of the executive committee and his vice president along with the supervisors of the other departments. The meeting was about a major issue, and the chairman of the executive committee was a good listener for his vice presidents who are his son without returning to the expertise attendance</i></p>	<p>كنت في اجتماع الاسبوع الماضي مع رئيس اللجنة التنفيذية ونائبه جنبا الى جنب وايضا مع مشرفي الاقسام الاخرى و كان الاجتماع حول موضوع مهم، وكان رئيس اللجنة التنفيذية مستمعا له لأنه بالأصل هو ابنه دون الرجوع إلى الحضور من ذوي الخبرة</p>
<p><i>Suddenly at work, the company decided to change the attendance time by increasing an hour without returning to us or even consulting in that matter, and put in consideration that at the early morning we have our family priorities such as delivering the children to school at the morning.</i></p>	<p>فجأة أثناء العمل، قررت الشركة تغيير وقت الحضور عن طريق الإضافة من الساعات دون الرجوع إلينا أو حتى مشاورتنا في هذا الشأن، وضع في عين الاعتبار ارتباطاتنا العائلية في الصباح الباكر مثل توصيل الاطفال الى المدرسة</p>
<p><i>There was a problem between two of my colleagues, and the solution was very easy, I went to my supervisor to consult him and take his opinion regarding the misunderstanding but he</i></p>	<p>كانت هناك مشكلة بين اثنين من زملائي، والحل كان بسيط جدا، وذهبت إلى مشرفي لأخذ مشورته ورايه في الخلاف الحاصل لكنه لم يأخذ مساعدتي بعين الاعتبار ابل ان الأمر اصبح اسوأ من ذي قبل !</p>

<p><i>didn't take my assistance in consideration even more it become worse than before!</i></p>	
<p><i>We are five at work, and suddenly the supervisor asks for a specific one of us, he always calls him to take his opinion, it is a favouritism.</i></p>	<p>نحن خمسة في العمل، وفجأة المشرف يطلب شخص معين من بيننا، دائما يدعو لأخذ رأيه، انها محاباه.</p>
<p><i>There is no system that assures the development of the employee regarding the training courses or even nominates him for a workshop!</i></p>	<p>لا يوجد هناك نظام يضمن تطوير الموظف بخصوص الدورات التدريبية أو حتى ترشحه لحضور ورشة عمل!</p>
<p><i>You are in a family business company, don't you ever think that they will provide you with a career development, just develop yourself, there is even no financial support!</i></p>	<p>انت في شركة عائلية، لا تتوقع منهم ان يمدونك بتطوير وظيفي، فقط طور من نفسك، حتى انه لا يوجد ايداع مالي!</p>
<p><i>I remember that we set for three hours in a useless discussion only to know how to get rid of the equipment's position in the right place.</i></p>	<p>أتذكر مره اننا قضينا مدة ثلاث ساعات في مناقشة عديمة الفائدة فقط لمعرفة كيفية التخلص من أماكن المعدات بوضعها في المكان الصحيح.</p>
<p><i>My manager always late in giving us the right solutions to adjust.</i></p>	<p>مديري دائما يتأخر في إعطائنا الحلول المناسبة لتطبيقها .</p>
<p><i>I have undergone through a training course for three days to understand the basics about Lean concept, and directly after my joining for my new position, they gave me new tasks in which I didn't get an enough training on them because the course was a short-term course.</i></p>	<p>خضعت لدورة تدريبية مدتها ثلاثة أيام لفهم أساسيات مفهوم الانسيابية، و بعد انضمامي مباشرة لمنصبي الجديد، تم تكليفي بمهام جديدة حيث اني لم احصل على تدريب كافي عليها لأنها دورة قصيرة المدى.</p>
<p><i>The assigned tasks for me takes months to get their results out, but the supervisor wants a quick result only, regardless their efficiency... I get tired... once he asked me to apply his instructions to arrange the storage and rebuilt its work structure to fast the productivity, he shouts at me every</i></p>	<p>المهام الموكلة إلي تأخذ أشهر للحصول على نتائجها، ولكن المشرف يريد نتيجة سريعة فقط، بغض النظر عن كفاءتها... أشعر بالتعب... سألني مرة بتطبيق تعليماته لترتيب المخزن وإعادة بناء بنية العمل بنية السرعة في الانتاجية، في كل مره يصرخ في وجهي، وعندما انتهيت العمل المراد القيام به، ظهرت العديد من المشاكل ، وفي كل مرة يطلب مني أن اقوم بنفس العمل مرة أخرى.</p>

<p>time, and when my work done, there were many problems accrued, and every time he asks me to do the same work again.</p>	
<p>I really don't work hard, I only do my work easily and I don't care about the problems, solving the problems are in the hand of the supervisor, and of course, if there were rewards I will work better.</p>	<p>في الحقيقة أنا لا اعمل بجد، فقط أمارس عملي بكل سهولة، ولا اهتم بالمشاكل، فحلها يقع على عاتق المشرف، وبطبيعة الحال، إذا كان هناك مكافئات فسوف أعمل على نحو أفضل.</p>
<p>We are complaining regarding the overload work in which we receive only the salary at the end of each month!</p>	<p>نحن نشتكى بخصوص العمل الزائد الذي لا نحصل إلا على الراتب في نهاية كل شهر</p>
<p>It would be better to have a competent system between the employees.</p>	<p>سيكون من الأفضل أن يوجد هناك نظام تنافسي بين الموظفين.</p>
<p>I had been working her for five years in the same job without change, it is the same job title!</p>	<p>لازلت اعمل منذ خمس سنين في نفس الوظيفة بدون تغيير، إنه نفس المسمى الوظيفي !</p>
<p>Actually, all the employees we have are efficient and we can't let them go, they are working in their field for more than five years in the same job, for that they are experts.</p>	<p>في الواقع، جميع الموظفين لدينا يتسمون بالكفاءة، ونحن لا يمكن أن نسمح لهم بالرحيل، إنهم يعملون في هذا المجال لأكثر من خمس سنوات وفي نفس الوظيفة، لذلك فهم خبراء</p>
<p>We are workers and we can't be promoted because we are only labour.</p>	<p>نحن العمال، لا يمكن أن نترقى لأننا مجرد عماله</p>
<p>We struggle from the lack of experience of the employees and their disability to solve the problems that occurs in the work.</p>	<p>نحن نعاني من قلة خبرة الموظفين وعدم كفاءتهم في حل المشاكل التي تحدث في العمل</p>
<p>Sometimes we discover that the recruited labour is working in a specialization which is different from his own.</p>	<p>أحيانا نكتشف في العمل انه تم توظيف عامل في تخصص يختلف عن تخصصه الاساسي</p>
<p>When I start joining the job, I discovered by myself how the work moves and who is the responsible for</p>	<p>عندما بدأت الانضمام في العمل، اكتشفت بنفسي كيفية سير العمل ومن هو المسؤول عن ذلك</p>

<i>it.</i>	
<i>Do you believe that there is no guide book for how to use the machines?</i>	هل تصدق أنه لا يوجد كتيب إرشادي عن كيفية استخدام الماكينه؟
<i>There is no attention to our requirements, I remembered once, that I asked for a return ticket for me with my family, this request took three months with the fellow up, however, they asked me to cut my vacation and return to the work because I might cause late in the workflow!</i>	لا يوجد هناك أي اهتمام لمتطلباتنا، انكر مرة واحدة، أنني طلبت تذكرة ذهاب وعودة بالنسبة لي ولعائلتي، استغرق هذا الطلب ثلاثة أشهر مع المتابعة المستمرة، ومع ذلك، طلبوا مني قطع إجازتي والعودة إلى العمل! لأنني قد اتسبب في تأخير سير العمل
<i>When I ask for a logistic support from other department, the request takes a long time to be processed.</i>	عندما طلبت دعماً لوجستياً من إدارة أخرى، اخذ الطلب فترة طويلة لتحقيقه.
<i>The management is very bad to some extent, for example, the requests system for the departments takes a long time to process.</i>	الإدارة سيئة للغاية إلى حد ما، فعلى سبيل المثال، نظام طلبات الإدارات تأخذ وقتاً طويلاً لتحقيق
<i>Actually, the choice of the team leader is from a personal standard and not from a standard of performance or efficiency.....(Lough).. what a miserable system</i>	في الواقع، اختيار قائد الفريق هو من مستوى معيار شخصي وليس من مستوى الأداء أو الكفاءة.....(ضحك).. والله نظام سيئ
<i>The recruitment department must recruit the right person in the right place who believes in the work ethics and values.</i>	إدارة التوظيف يجب ان تقوم بتوظيف الشخص المناسب في المكان المناسب حيث يؤمن بأخلاقيات العمل والقيم

Appendix B : Research Ethics System

The screenshot displays the Cranfield University Research Ethics System (CURES) interface. At the top, there is a navigation menu with options like 'Home', 'Contacts', and 'Help'. Below this is a 'Work Area' section containing 'Notifications' and 'Actions' (Create Form, Correspond). The main content area features a table with the following data:

Project Title	Form Status	Review Reference	Date Modified
ORGANISATIONAL CULTURE	Approved	CURES/625/2015	25/04/2016 17:42

Below the table, there are navigation tabs: 'Navigation', 'Documents', 'Signatures', 'Collaborators', 'Submissions', 'Correspondence', and 'History'. The detailed view for the 'ORGANISATIONAL CULTURE' project shows a 'Section' dropdown menu with options: 'Application Form', 'Supporting Documents', and 'Declarations and Signatures'. There is also a 'Questions' section with links for 'Part 1', 'Part 2', 'Part 3', 'Part 4', 'Part 5', and 'Part 6'. A 'Show Inactive Sections' checkbox is visible. At the bottom right, the footer contains the text: '© Infonetica Ltd 2016 Version 9.9.0.0 Terms and Conditions | Privacy Policy'.

Appendix C : Approved by Oil Company to conduct interviews

 **شركة المنتجات البترولية**
Petroleum Products Company

سجل رقم 1010254649 - 1010254649 - 1010254649

Date: 26/10/2016

To whom it may concern.

We confirm that Mr. ABDULLAH ALKHORAIF, ID No. 1023373457 has been accepted to be in the company for gathering data as a part of PhD research requirements from 25/11/2016 to 25/02/2017 for just 3 months by doing the following:

- * Focus group and Workshop (from 25/11/2016 and physically from 26/12/2016 to 25/02/2017)
- * Semi-structured interview (from 25/11/2016 and physically from 26/12/2016 to 25/02/2017)
- * Observation for 3 months (all the time during the period).

The investigation of the study has done under control and supervision of the PPC, administration.

This letter has been issued to him upon his request.

General Manager

Rasheed Ali ALRasheed



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Appendix D : Questionnaire scoring sheet

#	Description of the ideal position for organisational culture	Scoring Scale																			
		1	2	3	4	5	6	7	8	9	10										
		Disagree very strongly	Disagree strongly	Generally Disagree	Disagree somewhat	Disagree a little	Agree a little	Agree somewhat	Generally Agree	Agree strongly	Agree, very strongly										
1.	The employees and the managers have a good interaction between them. They communicate with each other to know exactly what is important, who is supposed to do what and when. Communication flows perfectly to fulfil the employee needs.																				
2.	The organization has a good planning, tactics and road map to achieve the goals of the organization for a long-term focus. The sequences of the tasks is undertaken in an appropriate way. The policies within the organization are clear. A good system of decision making exists and is applied in the organization.																				
3.	The buildings and support areas are appropriate for employees' requirements. The employee functions within his facility effectively. The structure of the organization around the employee is provided to ensure safety. There is guidance for all equipment. The organization provides appropriate facilities for employees (rest rooms, room for smoking and a coffee shop, etc).																				
4.	The organization operates systematically to achieve the goals of the business process, technology capabilities and operation environment in a collaborative way, identifying risks, taking appropriate actions to move or mitigate those risks.																				
5.	The Human Resources department is updated with the employees' needs. The Human Resources department evaluate candidates capabilities to ensure they can meet business requirements. The Human Resources department manage performance and solve job issues to allow employees to perform effectively.																				
6.	The organization's management is aware of the change strategy and take appropriate action to ensure the strategy is achieved . Management is flexible with the workflow to allow the employees autonomy in achieving their objectives. Leadership and team spirit are applied within the organization in a professional way. Respect and self-esteem are shown to all employees.																				
7.	The organization continuously works to improve the employee and process performance. The organization focuses on increasing capabilities, efficiency and effectiveness. .The organization continually strives to improve cooperation between various functions such as operations, human relations and productions.																				

Appendix E Focus group protocol

Focus group 1:

The main premise of the focus groups for this research was to utilize an action research approach in that the participants refined the aspects, named the categories while providing the data under each category, thus it reflected the ideas and perceptions of what is important to the employees.

Meeting data		Participant data	
Date: Start time: Meeting location: Elapsed time:		No. participant attended: Job classification/length of service:	
Introduction			
The initial small-talk period consisting of icebreakers, allowed participants to feel at ease. The first focus group to refine the aspects that were analysed from interviews. During the focus group, the researcher aimed to elicit participants' views about the existing OC aspects that have been created from interviews.			
Purpose		Refine the aspects that were analysed from interviews	
Result		Having conducted the main study using semi-structured interview transcripts, aspects of organisational culture were 37 aspects developed and refined by focus Group 1	

Appendix F Interview questions

Interview questions

Prearranged interviews were carried out at employees' place of work. In each instance, a private office was provided and the needs of participants were taken into account. Face-to-face interviews and semi-structured interviews have been taken. The initial small-talk period consisting of icebreakers, allowed participants to feel at ease. Open-ended, issue-focused questions were asked Sackmann (1991). Open-ended questions are more likely to prompt the participant to describe their experiences freely. The interviewees were free to talk as much as they wanted. The interviewees were informed that the interviews would be recorded for accuracy during the data analysis stage (Alkhoraif and McLaughlin, 2018a). The questions that were asked were issue-focused

- 1. Tell me about an example of when you have seen lean implementation work well?**
- 2. Tell me about situation where lean implementation has not worked well?**

During the interview, the researcher aimed to elicit participants' views about the existing OC, and the observations were relayed into the research. The researcher kept a journal of observations, and important events were utilized and recorded as suggested by Coghlan and Brannick (2014). The researcher halted conducting interviews after interview No. 29, since there were no further insights and the saturation level was reached