Exploring Lean Strategy for Service Quality Improvements in UK based Airline

A thesis submitted for the degree of Doctor of Philosophy

By

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ABSTRACT

As the airline industry continues to rapidly expand and evolve, today's airlines leaders are faced with the challenge of balancing long term strategies with short term solutions. Customer satisfaction has become significantly important for airline operations and as a result service quality has also gained paramount importance in this sector. Lean's customer-focused theme for improving service quality has gained a momentum in services, however, Lean deployment within the airline service sector is generally a long way behind manufacturing and health services. These factors have motivated research into investigating Lean phenomena within a leading UK airline company.

For quantitative and qualitative data analysis, 9 cases were collected from 3 internal departments of the airline company, 35 semi-structured interviews were held, and 220 survey questionnaires were circulated of which 180 were returned. Within-case and cross-case analysis techniques were applied and, to develop a framework and 5 key relationships were identified.

This study's contribution is in the area of Quality Management as it: (a) highlights the role of 'customer value' and 'engagement value' in the domain of technical and functional service quality attributes; (b) maps cost-quality-delivery relationships through linking Lean improvements to its results; and (c) constructs an 'outcome-driven' framework from the findings. Ultimately, this research provides knowledge and understanding of how an airline company deploys Lean as business strategy to improve their service quality. The novelty of the research in terms of deliverables is two-fold: firstly, it establishes framework linking Lean improvement initiatives to its results, which extends to the sustainability, commitment, future profitability and market share characteristics of improvement results; and secondly, it provides a tool, which could assist key decision makers in evaluating the results of the Lean initiative to provide better understanding for Lean deployment.

Key words: Lean services; business improvement strategy; service quality improvements; quality management; airline services; customer satisfaction; employee satisfaction.

DEDICATION

In silent prayer with head bowed, I dedicate this research to the memory and honour of my beloved father, Hatim Adib.

ACKNOWLEDGMENTS

DECLARATION

I hereby declare that all information in this document has been obtained following the academic rules and ethical conduct. This thesis contains my own work which is based on my own research.

Asmi Ali

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LIST OF ABBREVIATIONS

ABC   Activity Based Costing

BATA   British Air Transport Association

BPR   Business Process Reengineering

BSC   Balanced Score Card

CAP   Change Acceleration Process

CSF   Critical Success Factors

CTQ   Critical To Quality

DMAIC   Define, Measure, Analyse, Improve, Control

EFQM   European Foundation for Quality Management

FMEA   Failure Mode and Effects Analysis

FSQ   Functional Service Quality

GDP   Gross Domestic Product

IHIP   Intangibility, Heterogeneity, Inseparability, Perishability

JIT   Just In Time

NPS   Net Promoter Score

OECD   Organisation for Economic Co-operation and Development

OM   Operations Management

PDCA   Plan, Do, Check, Act

ROQ   Return on Quality

SOP   Standard Operating Procedure

SPC   Service Profit Chain

TOC   Theory of Constraints

TPM   Toyota Production System

TQM   Total Quality Management

TSQ   Technical Service Quality

VOC   Voice of Customer

VOE   Voice of Employee

WTO   World Tourist Organisation

CHAPTER 1 : INTRODUCTION

In today's increasingly competitive world of aviation, airlines are focusing their attention on service quality as a means to increase customer loyalty and retention. Leaders in this sector are under intensifying pressure to demonstrate that their services are customer-focused and continuously improving in quality and performance, and that any gaps in their service delivery are identified and addressed.

To meet the service delivery challenges, a number of leading airlines (for example, Luftansa, British Airways, Qatar) have adopted business improvement approaches to make improvements in their business and improve the quality of services they offer. A number of articles presented at the Annual Lean Flight Initiative (LFI) Conference, for example, 'Getting started with Lean' by William Muller (May 2011) and 'Icelandair's Lean Journey' by Pordis anna Oddsdottir (May 2014) indicated that major European Airlines such as Lufthansa, British Airways, Virgin, and Scandinavian Airlines have experimented with the 'Lean' method in parts of their operations to improve their business processes and consequently the quality of their service delivery.

In operations management (OM) literature, Womack, Jones and Roos (1990) introduced 'Lean' as a management concept originating from the Toyota Production System (TPS). They defined the term 'Lean', which Liker (2004) re-quoted, as:

> *"A complex, multidimensional and highly disciplined management practice which considers the expenditure of resources for any goal other than the creation of value for the end customer"* (Liker, 2004, p.45).

Reviewing OM literature revealed that the successful application of Lean is achieved by organisations who understand that the complexity of Lean is in its simplicity: to have a plan, do the plan, check the plan, and then adjust to improve upon the plan.

Yet the following question still remains unanswered: why are Lean principles so difficult for organisations to understand and execute effectively?

To provide the context for this subject, the way in which Lean is implemented within airline companies is considered for improving the service quality. Consequently, a case is presented for exploring Lean deployment in an airline service. The dissertation plan contains the overall research objectives, methodology, research design and central theory. Accordingly these are then integrated and developed into a framework in the context for an airline company.

1.1 Background

An article found on a Lean website (www.lean.org) written by Chet Marchwinski in April 2010, "*A Turbulent Industry Looks to Lean for Smoother Flying*" that covered incidents from the past few years and claimed that it was a challenging period for the airline industry. Marchwinski (2010) claimed that the downturn in demand in 2009 and substantial increases in fuel prices have become the catalyst for reduction in non-fuel costs and restructuring activities across the sector to improve their operational efficiencies. On the same topic, Allway and Corbett (2002) argued that service companies have recognised that an increase in operational efficiency reduces costs and delivers customer promises. They added that improvement in operational efficiencies consecutively supports competitiveness, sustains long-term profitability and delivers world-class service.

A review of the literature has listed Total Quality Management (TQM), Business Process Reengineering (BPR), Six Sigma and most recently Lean as the business improvement approaches that have been applied most successfully in the manufacturing sector. A point to note is that a number of scholars observed that Lean which originated in the manufacturing industry has become popular in the service sector and its popularity has spread to other sectors (Flynn et al., 1994; Kinnie et al., 1998). However, it was noted that the application of Lean within the airline sector is still at the preliminary stage, applying selected tools and techniques as a piecemeal approach for improvements and its total focus on cost reduction

(Swank, 2003). In support of this claim (Yasin and Alavi, 2007; Carlborg et al., 2013) added that it is imperative for service leaders to understand how the customer focused Lean approach can improve their services to drive their organisation forward.

Earlier, Dale (1993) commented that the relationship between Lean`s improvements and its results is vague. Mehra and Ranganathan (2008) and Piercy and Rich (2009) examined the nature of this relationship from the customer's point of view, and confirmed its importance. They argued that in order to have a positive long-term effect on business improvements, the improvement result should be evaluated. However, a review of the literature suggests that very little effort has been made to consider the internal customers (employee's) perspective into this dimension. This suggests a need for further action to be taken to explore and investigate this relationship and to include the external and internal customer perspectives.

In favour of the fast-paced airline business, this study establishes that there is indeed a literature gap for understanding how Lean can be deployed to improve business operations and ultimately to improve service delivery. Thus, the main purpose of this thesis is to discover how Lean has been deployed within airline services and identify the dynamic interplay between Lean and its improvement results for airline services. Through understanding the approach taken for Lean initiatives, this research seeks to construct a framework that can link the Lean initiatives to its results. Such a theory will provide a road map to assist airline service leaders to focus their efforts on improvements, sustain improvement changes and then continuously improve.

For this research context, several related terminologies stated as recorded in the literature, such as 'Lean Management System', 'Lean Business Improvement System', and 'Lean Continuous Improvement' or 'Lean Process Improvement', all of which are referred to as *'Lean'* a broad term that will be used from this point onwards.

The following subsequent sections creates a research context by defining the research aim, objectives and the structure of the thesis. First, however, the outlook for the aviation industry is presented below.

1.2 Industry outlook

A report published in 2013 by the British Air Transport Association (BATA) indicated that the United Kingdom (UK) is a major destination for overseas visitors. The statistics confirm that during 2012 73% of visitors arrived to the UK by air, contributing over £15.6 billion to the Economy. Air travel is valuable to a wide cross-section of the nation. The statistic points that 50% of the UK population travel by air at least once a year and three quarters at least once every five years.

In September 2012, the World Tourism Organisation (WTO) reported that the UK ranked fourth worldwide in outbound tourism in 2011, spending £50.6bn. The UK Airline services for example employ 1.4 million people, translating into 5% of Gross Domestic Product (GDP) of £70.3bn (source: http://www.ons.gov.uk/ viewed on May 25, 2013)*.*

Despite the industry growth, the aviation sector has undergone a troublesome period especially in the aftermath of the September 11, 2001 attacks on the US and has had fair share of business challenges. A number of studies carried out by a number of scholars have indicated that there are inherent problems in this sector due to cyclical and seasonal demand, high labour/capital, fuel intensity, government intervention, and organised labour, political upheavals and even volcanoes making airlines a turbulent industry both in the air and on the ground (MacKenzie-Williams, 2003; Raghavan and Rhoades, 2008).

A report published in 2000 with a title '*Why Service Stinks?'* recorded that between 1994 and 2000 airline services had the largest drop in customer satisfaction (Brady, 2000). Rhoades and Waguespack (2005) noted that passengers reported crowded planes, flight delays, unclear and complex ticketing rules, flight restrictions, and services provided by employees who seemed to overlook that they are working for an airline and airlines is part of 'service industry'. After the 11th September 2001,

consumers gave the benefit of the doubt to obviously under pressure carriers for a number of years, but that honeymoon period is now well over.

The data presented in the Associated Press (2007) recorded that some carriers posted on-time arrival rates on average of 72 per cent, and the rate of mishandled baggage increased to 6.5 per 1,000 passengers. To add to the quality distresses troubling airline services, some carriers such as JetBlue Airways, Air Lingus suffered very public meltdowns (i.e. reputation collapsing, financial and operations breakdowns). For instance, due to the low staffing level in the JetBlue Airways operations this resulted in the stranding of over 5,000 passengers on Valentine's Day in 2007. It has been claimed that this single event costed JetBlue Airways approx. 14 million in US dollars in refunds and overtime (www.lean.org, 16/04/2010 viewed on May 25, 2013). The cost in terms of reputation and goodwill for the carrier is not publicly known. Mahour and Fini (2010) made a comment that airline services appears to have gone backwards in terms of the quality of their offered services.

Within the literature there are more examples that shows decline in airline service quality. Raghuvanshi (2014) observed that consumers are finding that *'meals have been reduced to peanuts and a soft drink, pillows plucked from under passenger's heads; the warmth of flying gone with the blankets'*. He claimed that this reduction in service levels were first applied into economy class but then it spread to business class passengers. The upper class passengers are feeling the pinch and they have complained that the high price they pay does not match the level of service that they expect to receive. He further added that carriers tend to overbook their flights to make as much money as possible with their refund policy in terms of reduced fares or offer coupons at a later stage as a bid to survive. He claimed this forces airline carriers to cut out the easy expenses of meals, pillows, and blankets to quickly reduce costs. Employee morale also plummets as they fear job loss, pay cuts or benefit reductions. Therefore, it is not surprising that carriers such as Delta, United, US Airways who rate the lowest in terms of service quality and have experienced financial distress or even bankruptcy during 2012 (Raghuvanshi, 2014).

Mahour and Elham (2010) confirmed that a number of airline analysts have reported that the service offered by Western airlines appears inferior in comparison of the services offered by their Middle East competitors. They argued that for a country's prosperity and growth, it is essential to have a healthy airline industry. Truitt and Haynes (1994) argued that transportation and tourism is one of the largest sectors of the economy and quoted some figures such as gross output is in the range of US$3.1 trillion and 130 million employees have been employed in this sector.

In response to the dim financial outlook and competition from desert airlines, Western airlines were cutting costs and combining forces through mergers and acquisitions in order to survive and beat the competition. However, Kim and GU (2004) observed that airline services were increasingly being questioned, particularly as to whether Western airlines could provide good levels of services.

Gittell *et al.* (2003) and Listes and Dekker (2005) noted that the unpredictable nature of demand adds complicity to manage airlines' day-to-day operations. Listes and Dekker (2005) carried out a study that showed that reductions in wages and salaries became the major determinant of profitability in the airline industry but warned that while these efforts may provide a short-term solution to the problem, sustainable performance can only be achieved through focusing on relational factors. They added that in this instance it is important to determine factors that contribute and reasoned that this would help airlines to focus on the practices that simplifies their operations and allocate their resources accordingly.

1.3 Research focus

Service quality described by three scholars in the literature as an excellence in service that meets or exceeds expectations or its value perceived by customers (Parasuraman *et al.,* 1985; Garvin, 1987; Cronin and Taylor, 1992).

According to the service literature, a number of scholars proclaimed that defining and categorising the service quality elements have confused many service managers and this may be the one of the reasons that may have impacted to effectively derive,

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implement and control improvement initiatives (Gittell *et al.,* 2003; Tsikriktsis, 2007; Backhaus *et al.,* 2011; Ayanso and Mokaya, 2013). Consequently, the goal of this research is to explore and understand how an airline company has adopted Lean business improvement methodology as a business strategy with an aim to improve their services.

Womack and Jones (1996) noted that service organisations introduce Lean as a business strategy to reduce costs, improve efficiency and to enhance services. Within the service literature, Kamakura *et al.* (2002) argued that a higher level of service can distinguish one service company from its peers and lead customers to choose that company over the others and can be considered a critical determinant factor of competitiveness.

Gittell *et al.* (2003) agreed and added that initiatives to improve service quality are becoming increasingly strategic in nature. They commented that the service organisations are focusing significantly more to improve their service quality as a means to achieve distinctive competencies in their competitive markets. They added that to deliver better services is a business strategy that is being increasingly adopted by service organisations to position themselves and to stand out against their competitors within their business sector. However, Gittell *et al.* (2003) pointed out that delivering better services means improving service quality over all and they stressed that service quality is an abstract idea and can be difficult to define and measure.

A study carried out by Buavaraporn and Tannock (2013) within financial institutions in Thailand that adopted business process improvement methodologies to improve their service quality. They confirmed that service quality improvements can be made through adopting business improvement approaches and Lean was included as one of the business improvement method. They argued that the specific nature of the relationships between improvements to its results continues to elude service leaders. Their study concluded that service quality plays a role in every dimension of a business including price, market shares, costs and profits. Their study explored the

relationships between improvement initiative and its results and included customer perspective in that mix.

The relationships between service and purchasing decisions remain largely unexplored as claimed in the literature by Parasuraman, Zeithaml, and Berry (1988). They noted that that there is a wider interest in the measurement of services and this has generated a discussion among both practitioners and research circles.

Fijorek and Lesniewska (2012) confirmed that the quest for better understanding on how customers' judge services that contribute to their purchasing intentions. They pointed out that this is one of the key challenges facing service leaders.

A number of scholars noted that improvement in service quality is a commonly used output measure in service sector (Roth and Jackson, 1995; Soteriou and Stavrinides, 1997; Soteriou and Zenios, 1999; Metters, Frei and Vargas, 1999; Kamakura *et al.*, 2002). Parasuraman (2002); and Ayanso and Mokaya (2013) noted in marketing that, Bigné, Aldás and Andreu (2008) observed in B2B services, Backhaus *et al.* (2011) detected in maintenance, Amy, Alison and White (1999) spotted in the Hotel sector. Also Soteriou and Zenios (1999); and Fijorek and Lesniewska (2012) noticed improvements in service quality in airport operations.

In airline services, several scholars reported different types of service measures that were used alongside financial measures such as Revenue Passenger Miles (RPM), are used as physical data known as measures (Douglas and Miller, 1974; Graham *et al.*, 1983; Bitner *et al.*, 1990; Windle, 1991; Schefcyzk, 1993; Truitt and Haynes, 1994; Good *et al.*, 1995; Bejou *et al.*, 1996; Scheraga, 2004; Lapre and Scudder, 2004; Wyld *et al.*, 2005; Tsikriktsis, 2007, Sherry *et al.*, 2007; Yayla-Kullu and Tansitpong, 2013). Some of these scholars have stated that some airlines are trying to quantify the 'dissatisfaction' of their customers, such as on-time performance, mishandled luggage, and frequency of complaints to measure and improve their service (Bitner *et al.*, 1990; Bejou *et al.*, 1996; Lapre and Scudder, 2004; *Wyld et al.*, 2005).

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Tsikriktsis (2007) and Sherry *et al.* (2007) argued that such measures do not have any implications on how the work is done or how it should be done. Moreover, they stated that some output measures focus on how badly work is done instead of actual customer satisfaction. They added that while it may be important to measure how 'badly' work is done, it is more important to measure how 'well' the service is delivered. They went on to explain that passengers' actual experience builds the image of an airline. Therefore, it is critical that passengers have a positive experience even when there are no significant failures (e.g. delayed flights, lost luggage, or complaints). This view has also been supported by Namukasa (2013) and Jager and van Zyl (2013) who claimed that delivering a high level of services to their passengers is essential for airlines to survive in the competitive world.

Some scholars claimed that with increased satisfaction comes increased profits (Nowak and Newton, 2006; McKechnie, Grant and Golawala, 2011; Saleh *et al.*, 2013). Therefore, there exists a direct relationship (linear) between customer satisfaction and profitability (Nowak and Newton, 2006; Saha, 2009; McKechnie, Grant and Golawala, 2011; Saleh *et al.*, 2013; Carlborg *et al.*, 2013).

Reviewing the literature suggests that service quality are considered difficult to distinguish, both conceptually and operationally for airline services. Moreover, Becker *et al.* (2011); Backhaus *et al.* (2011) pointed out that customers' perceived quality has not been studied within the literature for airline services. Becker *et al.* (2011) claimed that the current service measures are inappropriate for evaluating service quality that results from improvement initiative. Hence, this triggered the study to explore this phenomena in a greater detail.

1.4 Aim, Objectives and Research Question

The main focus for this dissertation is to explore and investigate how an airline company deploys Lean to improve their services. The intention is to understand in depth how Lean improvement initiatives are initiated, executed and evaluated to improve their service quality.

To achieve the above research aim, the following five detailed research objectives should be satisfied:

(1) To carry out a review and critique the literature and produce a taxonomy of views on Lean and airline services elements. This will provide background to the research and highlight the gaps within the literature.

(2) To identify factors which are based around the concepts of service quality improvements, formulate a central focal theory for the UK airline company that can serve as a thesis foundation.

(3) To develop a research methodology and research design to gather empirical data and to test the central theory.

(4) To analyse and test the data in providing empirical evidence and compare it with the central (focal) theory.

(5) To construct a framework that is relevant to the UK airline company for appraising service quality improvements.

Based on the above five objectives which focus on the UK airline service company, an overarching and important research question has arrisen, which is as follows.

RQ: 1. How has the Lean approach been adopted within an airline context with a view to select a Lean initiative that is aligned with their strategic objectives and how can its effectiveness could be validated?

In order to meet these objectives and answer the overarching research question, this thesis highlights the significanct way of how lean improvements are viewed and implemented within the airline services for improving their services. It explores the relationships between the lean improvement initiatives to its results.

1.5 Scope

As discussed in the previous section (1.3) that Lean can be deployed for improving services and hence Lean has been promoted as a business improvement strategy within services.

This research is positioned in the areas of Lean and services domains and the research scope is described below:

- The main focus is studying the Lean adoption process or procedure in a multi-national airline company which is positioned as a business improvement strategy for improving their services. The symbiotic (links and relationships) and semiotic (structure of the meanings of Lean business strategy and improvement results) both have been examined and through this context meaning as well as reasoning of the content combination is recognised.

- A research design model is developed in the context where the collaborating case study company is located (UK based Airline Company). However, it is hoped that the findings will be applied more generically

- Based on the research design model, the focus is to evaluate the Lean initiatives results at the operational level. For this activity, performance management theory will be explored.

Due to the collaborating airline company's policy on commercial confidentiality, the Lean initiatives impact on the company's financial performance is not included, therefore financial performance measures are considered out of the scope of this thesis.

1.6 Structure and Methodology

Taking an empirical and an interpretivist viewpoint, this dissertation explores the Lean application for service quality improvements within a single UK based airline company. A case study approach has been adopted which is defined by Yin (2014) and Nieto and Perez (2000). They claimed that the case study approach enhances the dynamics present within single settings. Baxter & Jack (2008) stated that the case study is usually applied for field-based research in operation management (OM) and supports to develop a theory that is based on data from 'real world' situations. This in turn seals the space between management practices and management theories. Yazan (2015) agreed and commented further that for data

gathering, a mix of quantitative and qualitative approaches are generally being used in service sectors.

The following figure 1.1 outlines the dissertation structure which was adapted through referencing the thesis of Sharif (2008). It references the methodology proposed by Nieto and Perez (2000) that include background, data and central theory which then supports to develop a novel contribution.
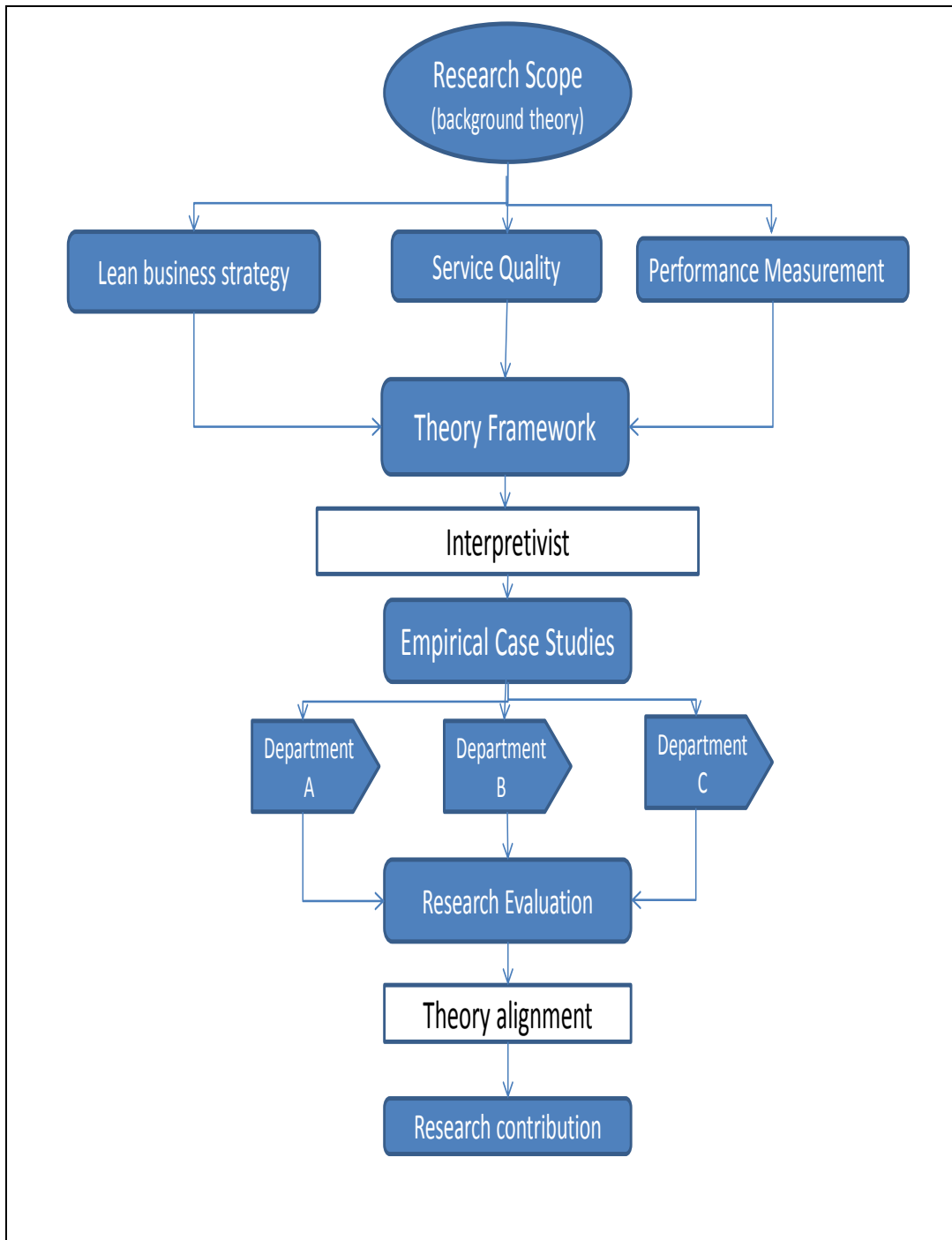
Figure 1.1: Dissertation roadmap

- Research Scope (Background theory):

To enhance an understanding of the deployment of Lean to improve services, a survey of the literature is required to represent the related subjects within the literature; this is included in Chapter 2. This chapter covers the

background on the research and identifies Lean, service quality and performance management as a three main components of the research (see Figure 1.1)

- Central (focal) Theory Framework:

This is the second part of this thesis that is a central theory. In this part of the dissertation the area for research is highlighted together with the points that require further investigation. This then starts the analysis process. This is presented in Chapter 3. The central theory contains the initiation, execution and evaluation (results), which relate to and have some bearing on the scope for this thesis overall. The research methodology together with the research design is contained in Chapter 4. The well-known case study approach which is defined by Yin (2014) is used and it is complemented by data-gathering practices. An interpretivist viewpoint is considered for the analysis rather than a positivist approach. Eisenhardt (1989) recommended that the overriding approach and context of the analysis should be understood in both interpretivist and positivist terms. Considering these methodological viewpoints, theoretical representations and research questions are generated to drive the academic discussion forward and are presented in Chapter 4. The back-story to this research is presented, and any data requirement to aid any theoretical hypotheses are also recognised

- Empirical Case Studies:
Eisenhardt (1989) recommended to establish consistent lines of enquiry and based on that appropriate data gathering research methodologies should be devised. He stated that in order to make decisions a certain number of cases should be collected. He justified that this supports interpretivist views (assumptions and beliefs) of knowledge, and at the same time the development of positivist views, forming the empirical research methodology that guides the research process (Eisenhardt, 1989).

Chapter 4 covers the data theory and rationalises the importance and validate the information that has been collected in the thesis. Chapters 5 and 6 include

this data in the form of discussions on processes and activities that have been carried out within the airline company.

- Research contributions: Novelty of the research and developed a framework of Lean specific for the airline industry. This the final component of this dissertation that includes an alignment of the thesis to the background theory in a reflective manner and approach applied for the research. The chapter 7 includes the thesis contribution together with the research limitations, followed by suggestions for further work. This section discusses the enhancement to the background theory and highlights the differences with the central theory.

CHAPTER 2 : BACKGROUND THEORY

This chapter reviews empirically the published literature on relevant aspects related to the thesis context and creates a boundary for this study. The focus for this chapter is to review the relevant Lean adoption literature in order to provide a theoretical foundation for the research. Furthermore, literature on service quality and performance measurement are explored and analysed in context of airline services. In order to define the boundary for the literature review a novel taxonomy is proposed. The chapter concludes with considering the central theory to identify the complexities and dependencies of the airline company.

2.1 Literature review approach

To commence the literature review, a list of key words and phrases that are most commonly associated with the research subject, e.g. 'Lean management', 'Lean methodology', 'Business process improvement', 'Service quality', 'Service quality attributes' 'Performance measures', 'Performance measurement framework' was constructed. Figure (2.1) is generated to the iterative and cyclic approach applied for this activity in defining the subject parameters, generating key words, searching databases, identifying literature, evaluating its relevance, and if relevant then recording any information that may lead to the identification of new parameters/keywords. Each cycle was becoming more focused and narrow, as shown below.

Considering the research question and objectives defined in the chapter 1 (page 9-10), a list of parameters were recorded. Theses parameters then helped to formulate a set of keywords. These key words were then used systematically to search articles in the three most popular databases namely ABI/INFORM, Emerald and Business Source Premeier Academic Literature. The search within these source databases matched and returned a number of articles, journals, thesis and other publishing materials. The categorisation of these serch results can be found in Appendices A1.1

and A1.2. The abstract from these results were read to ascertain if it matches the subject of the thesis.
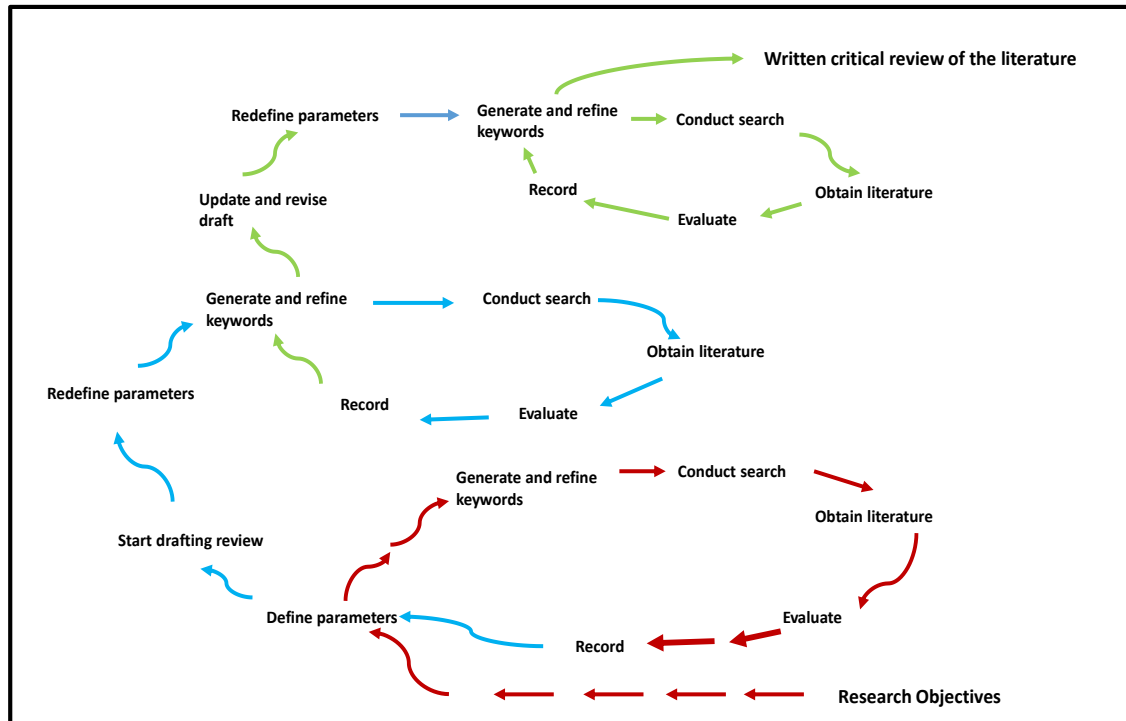
Figure 2.1: The cyclic approach taken for literature review

Adopting the cyclic approach (as depicted in figure 2.1) returned 170 peer-reviewed published (up to year 2013 and 2014) journals/articles/documents and created a list. After glancing through these documents, a number of associated articles were also reviewed, which were listed within the reference section of the original articles. Reviewing these, this author found that some articles were irrelevant to the subject of this dissertation and therefore removed them from the original list. The final numbers of reviewed academic papers were in excess of 95. These articles were read to extract information, lesion learned and their reference details were recorded.

2.2 Overview of business improvement methodologies

A number of scholars have noted that business improvement methodologies have been adopted in a few services such as finance, education, law, healthcare and government (Hammer, 1990; Antony, 2004a, 2004b, 2006 and 2007; Chakraborty and Tan, 2012). The four four most popular methodologies (TQM, BPR, Lean and

Six Sigma) have been shortlisted as these are recorded in the literature. The two most recent methods were reviewed in depth: Six Sigma and Lean. The TQM and BPR approaches were considered since these approaches have been adopted in services and therfore briefly described.

2.2.1 Total Quality Management

TQM is considered to be the "mother of all" of the more recent process improvement methodologies. With TQM, the quality movement began, and the notion of continuous improvement entered the conscious of management. TQM was based on Deming's 14 points, and embraced a philosophy that involves 4 major areas:

1. Managerial responsibility for continuous improvement
2. Focus on the work processes to achieve improvements
3. Use of statistics to measure process performance
4. Employee involvement and empowerment

The basis of TQM is to reduce the errors produced during the manufacturing or service process, increase customer satisfaction, streamline supply chain management, aim for modernisation of equipment and ensure workers have the highest level of training (Rother, 2004).

TQM led to a revolution in managerial thinking and was embraced on a world-wide basis. Many authors state in the literature that after twenty years or so, business wanted something new and therefore TQM had evolved into Six Sigma – another improvement methodology

Total Quality Management (TQM) philosophies appeard to be developed from an amalgamation of approaches recommended by Deming (1954), Juran (1954), Ishikawa (1960), Feigenbaum (1951), Taguchi and Crosby (1979) often known as 'quality gurus'. Dean and Bowen (1994); and Johnston (1995) observed that TQM is used for products and services dimensions which are deemed to be important to customers. Johnston (1995) claimed that TQM underlying theory is to concentrate on

the management of people (leadership, teamwork), and process improvement. Its aim is to satisfy customers. Anderson *et al.* (2006) observed that TQM considers Deming's PDCA cycle (Plan-Do-Check-Act), and emphasised that it is similar to the incremental Japanese improvement approach known as *Kaizen (*Rother, 2004).

The literature classifies that TQM has two dimensions: 1) social - soft; and 2) technical-hard. The soft dimension for example leadership, people focus, and training has encouraged TQM's adoption in services, claimed by Prajogo (2005). In support, Bou-Lusar *et al.* (2009) added that both social and technical dimensions are interrelated and supportive to each other. A number of other scholars such as Mehra and Ranganathan (2008) and Kumar *et al.* (2008a) argued that TQM's holistic approach integrates all functions and focuses on the customer needs and organisational objectives. It focuses on quality, productivity and competitiveness elements.

Agus (2004) and Kumar *et al.* (2009) observed that TQM has been successful in all dimensions such as financial, performance, quality, and customer aspects. However, some criticisms and concerns have been noted by various scholars (Hackman and Wageman (1995); Powell (1995); Narasimhan (2003); and Mehra and Ranganathan (2008)) for TQM adoption. They explained that these criticisms are linked due to the lack of a structured approach applied for improving the process, difficulties in measuring TQM outcomes, and the costs and time scale of implementing TQM.

TQM Criticisms

A number of scholars have also claimed that TQM is not beneficial for organisations that operate in quickly changing business environments with short lifetimes of technology. They stressed that these organisation should focus on innovation rather than optimising their current operational process (Powell, 1995; Narasimhan, 2003).

Kumar *et al.* (2009) commented that TQM has theoretical weakness and breeds practical ambiguity. They further elaborated that this ambiguity manifests itself in several ways. At a most basic level, TQM advocates provide no guidelines for implementation. How should management enrol employees/unions in the TQM

vision and campaign? How should management encourage employee creativity and, at the same time, control the production/operation system?

TQM contains contradictions that should be acknowledge and addressed, stressed by Narasimhan (2003) and Agus (2004). For example;

- standardisation vs. continuous improvement
- do it right the first time vs. innovate, take risks
- quality enhancing practices may upset customers (security checks at airports; no smoke rules)
- commitment to the customer vs. commitment to the bottom line
- empowerment vs. control

2.2.2 Business Process Reengineering

Hammer (1990) defined Business Process Reengineering (BPR) as:

> "*The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed*" (Hammer, 1990, p.4).

To achieve the objective of BPR, Hammer (1990) suggested that members from all of the related functional units should be gathered and formulate as an improvement team to improve the business process.

However, in spite of the popularity of BPR, Povey (1998), and Shin and Jemella (2002) observed that BPR was criticised and perceived as a methodology that lacks a concrete foundation for its implementation. They claimed that it pays too little attention to the softer side of business change such as reward, motivation and people involvement. These factors are important for services such as airlines where frontline employees' involvement and interaction is vital for service delivery (Jemella, 2002).

Besides the TQM and BPR approaches, it was noted in the literature that in 2003, both Lean and Six Sigma have been widely adopted as business improvement

strategies within the service sector. The following two sections thus provides detailed literature on Six Sigma first and then covers Lean.

2.2.3 Six Sigma

Six Sigma, as defined by Nave (2002) and Antony (2004a) is a business improvement approach that identifies defects or failures in business processes. The approach identifies and eliminates root causes of defects in order to achieve breakthroughs in improvements. Review of the literature confirmed that Motorola as a first company to adopt the Six Sigma concept. Subsequently, General Electric, American Express, and Ford have also   adopted Six Sigma.

Henderson and Evans (2000); Antony (2002); Kuei and Madu (2003); and Horel (2004) commented that Six Sigma's focus is on reducing the process variation, by applying statistical thinking and methods. Hensley and Dobie (2005); Snee (2010); and Grima *et al.* (2014) added that Six Sigma contains five steps - **D**efine, **M**easure, **A**nalyse, **I**mprove and **C**ontrol, often referred to as DMAIC. Table 2.1 below lists each step of the approach together with its objective.

Table 2.1: DMAIC steps

Phases	Objective
Define	Consider business stakeholders viewpoints and define the critical to quality (CTQ) objectives.
Measure	Identify process measures by considering CTQ
Analyse	To understand the problem, gather and analyse data of process variation, and identify the root causes of the problem
Improve	Identify an appropriate solution to the root causes
Control	Establish systems and structures to sustain improvements

Source: Hensley and Dobie (2005), Snee (2010) and Grima *et al.* (2014)

Reviewing the literature highlighted some examples of benefits of Six Sigma implementation in services. Rucker (2000) recorded that the banks Citigroup and JPMorgan Chase benefited from applying Six Sigma in their financial operations,

whilst Lapré, and Scudder (2004) recorded Six Sigma application in airlines, these are listed below:

- Reduced credit processing time by 50 % within the call centre
- Reduced the credit decision making time by 67 per cent (from 3 days to 1 day
- Reduced order processing cycle time from 28 to 15 days within the contact centre
- Improved flow of information in account opening, and payment processing and reduced customer touch points

Even with the popularity of Six Sigma in services, a number of challenges of its application have been recorded in the literature. These are discussed below:

- Grima *et al.* (2014) noted that one of the main challenges is obtaining data, as sometimes for some processes there is no data available and sometimes it can take long time to obtain data, taking the largest proportion of the project time
- Hensley and Dobie (2005) claimed that selecting the right projects is critical for Six Sigma. They observed that in many companies the improvement initiatives selection is still based on subjective judgement
- Kuei and Madu (2003) noted that the statistical definition of Six Sigma is 3.4 defects per million opportunities. For service processes, a defect can be described as anything which does not meet customer needs or expectations. Therefore when we calculate the sigma capability level of a process, not all defects are equally good. For example, in a hospital defect could be a wrong admission procedure, untrained staff, misbehaviour of staff to help patients when they have specific queries (Kuei and Madu, 2003)
- Snee (2010) noted that establishing Six Sigma into a corporate culture requires a significant investment. This would discourage many small and medium size enterprises to use Six Sigma as an improvement strategy (Snee, 2010)
- Hoerl *et al.* (2001) reviewed the approach for Six Sigma certification of green belts (professionals who have an understanding of what Six Sigma is about),

black belts (professional who are proficient in Six Sigma and supporting tools and techniques). They concluded that the capability of green belts or black belts varies enormously across the service organisations, and it the level of certification is depended upon the certification body. They concluded that capabilities of green belts or black belts are unequal. (Hoerl *et al.*, 2001)

Despite the challenges listed above, Antony et al. (2007) posed the question in the literature; *''How is Six Sigma different from other quality improvement practices?''* and The following points were recorded:

- It achieves quantifiable returns to the bottom-line (financial) for an organisation, considering facts/data rather than assumptions and hunches
- Statistical thinking is applied using well known tools and techniques. It fixes problems/issues surfaced in business processes in a systematic way.
- It integrates the human elements and process elements of improvement initiative together
- It forms an infrastructure that includes green belts, black belts, and master black belts to coach and implement the approach.
- It places significant importance for strong and passionate leadership and demand a support that is required for deployment

Hoerl (2004) and Antony (2004b; 2006) reiterated the fact that, as distinct from other methodologies, the strength of Six Sigma is that it creates a clear focus for measurable and quantifiable returns. They claimed that through analysing operational processes, defects can be identified and investigated to *how* and *why* defects occur.

Heckl *et al.* (2010) supported this claim and said that DMAIC is similar to the problem-solving steps of Deming's Plan-Do-Check-Act (PDCA) cycle; however, they also observed that for some tools (notably Ishikawa diagram / cause-and-effect diagrams), statistical process control) has heavy emphasis.

Table (a-3), Appendix A compares the four business improvement methodologies covered in this dissertation. It provides a summary of their origin, its area of focus, methodology that is used and some example tools that are being applied.

2.2.4 Lean

Womack, Jones and Roos's in their book (1990) '*The machine that changed the world' in* 1990 when the Lean concept gained momentum in the West. The term 'Lean' was defined by John Krafcik, in 1988 when he published his article '*Triumph of the Lean Production System'.* Womack, Jones and Roos's observed that in manufacturing, mass production was changed to Lean production and called Lean Manufacturing. Jones *et al. (*1999) observed that mass production had introduced a huge amount of 'waste' with a little 'customer value'. Hines *et al.* (2004) pointed out that 'customer value' is created through removing wastes and enhancing service features without adding further cost. Dahlgaard and Dahlgaard-Park (2006) argued that Lean is an idea about 'doing more with less' using the optimal sequence with a minimal handover/human intervention (where possible). Thus it improves the flow of processes in the most economical way.

Womack and Jones (1996) depicted a roadmap for how Lean could be implemented and warned that it can take up to several years for sustainable success to be reached. They divided the roadmap into four main phases as follows:

1. **Get Started** by finding a change agent, obtaining Lean knowledge, mapping value streams and expanding company scope
2. **Create a new organisation** by recognising product family, creating a Lean function, devising a growth strategy and instilling a "perfection" mind-set
3. **Install business systems** through introducing Lean accounting, relating pay to firm performance, initiating policy deployment and introducing Lean learning
4. **Complete the implementation** by applying previous steps to suppliers/customers, developing global strategy, transitioning from top-down to bottom-up improvement

To support this road map, they idenfied the five key principles of Lean and claimed that these principles are universally applicable to any business sector and can be modified to fit in with service characteristics. These principles are discussed below in the section 2.2.4.1.

2.2.4.1 Lean principles

The following five paragraphs lists and explains these five principles and discusses its applicability for airline services.

Principle - 1: Value – specify value

This principle defines value from the end-customer perspective. Value means what customer perceives as important and he or she is willing to pay for. Womack and Jones (1996) explained that the value is generated for a specific products/services that have specific capabilities with specific price at specific time. In the context of the airlines, this means that providing what a passenger is looking for (satisfying their needs) by minimising cost and delivery time at required location.

Principle - 2: Value Stream - identify the value stream and waste

A value stream is defined by Womack and Jones (2005, p.74) as "the processes of creating, producing, and delivering a good or service to the market." Understanding the value stream is important for two reasons. First, it enables us to group products by the processes that make them. Second, knowing the value stream allows us to focus on a set of linked processes and helps to prevent distraction in analysis.

This principle focuses on identifying, categorising and eliminating 'muda' (waste) along the value stream. Womack and Jones (2005, p.84) categorised seven types of waste initially but then added one more waste to suit services. The most common acronym used is 'DOWNTIME' (Piercy and Rich, 2009). These wastes are listed below with their manifestation within the airline services:

1. **D**efects refers to the mistakes which require rectification. Such as late work, incorrect information, conflicting information, *instructions that must be*

clarified, insufficient information, partially complete work or information, miss-named records, lost records or information.

2. **O**ver-production of goods that are not required or making more than is immediately required. For example, writing formal documents or content where only the table is needed and most often read.

3. **W**aiting refers to goods awaiting processing or consumption. For instance people are waiting in a queue at multiple locations.

4. **N**on-utilised resources/talents. Unfortunately, this happens mostly in airlines as they tend to be a semi-large organisation and in that, the skills and background of everyone are not common knowledge. This results in underutilising capabilities, delegating tasks with inadequate training.

5. **T**ransportation of goods between processes without purpose. Manifestations include where the work is transferred from one person to another

6. **I**nventory half-completed products which are waiting to be processed are considered as unnecessary inventory. Inventory is a common result in airline services of un-balanced workloads. Inventory can be found in e-mail, to-do-lists, and product development pipelines.

7. **M**otion is the unnecessary movement of employees and products – people moving or working without producing. Meetings are motion in the sense that they are work without producing, unless a decision is made or information is produced during the meeting.

8. **E**xcess processing for goods and services that do not meet the customer needs. This is due to tighter tolerances. In an airline organisation with a multilevel hierarchy of management structure, excess processing shows up in additional signature approvals, data entry at number of levels and production of complex forms.

Principle - 3: Flow - make value flow

This principle ensures working on each product/service requirement continuously so that it creates a flow between the steps of value creation. In the context of airlines, customer check-in at the airport is quickly moved from security, customs, boarding queues, as smoothly as possible, creating a flow in end-to-end check-in process.

Principle - 4: Pull – customer pulls value

Womack and Jones (1996, p.74) specify that this principle enables the customer to pull the product/service from the organisation's value stream. For the airlines this principle implies that the production of a product/service should not be triggered if the customer has not expressed any need.

However, Piercy and Rich (2009) noted that applying the concept of flow and pull as a principle of Lean is sometimes difficult for service processes. They recorded that people look for intelligent hybrid solutions that mimic the concept of pull as seen in manufacturing companies. For example, creating Andon or a cellular layout for airline services requires thinking outside-the-box, which may be supported with technology. For example, a pop-up message from the front line staff to the duty manager who may be positioned in the back office would help to exercise Flow and Pull principles.

Principle - 5: Perfection - pursue perfection

This principle encourages organisations to set its sights on perfection. It requires constant striving, in order to, define customer value and a continuous alignment of processes/policies and structures. In the airline context for continuous improvement, the value created at each step of the value stream requires a challenge to increase the flow, speed and robustness, identify and eliminate concealed waste from their business processes.

Haque and James-Moore (2004) commented that Lean principles consists of small steps and advised that a company should follow these five principles to implement Lean thinking. A number of scholars have agreed that using the Lean approach in a

services setting is slightly different than in Lean manufacturing (Ehrlich, 2002; Apte and Goh, 2004; and Bhatia and Drew, 2006). However, they all are in agreement that Lean principles are still valid for services. Furthermore, they acknowledged that these five principles can be adapted for services and these principles remain unchanged.

Womack and Jones (2003, p.72) explained that whilst these principles are conceptually applicable to any sector, but these have to be tailored to suit to the sector where they have been adopted. They elaborated that, for example, for the service sector, these principles, in the context of services do provide some challenges. This is due to the fact that operation of service processes are fundamentally different. The distinctions on service processes and the challenges for services are discussed in section 2.3.2.

Reviewing the literature suggests that as service organisations adopt Lean, evidences suggest that service efficiency improves and costs are reduced. The following examples are taken from the literature that shows the efficiency gains and are specific to the services organisations who have applied Lean thinking:

- 50% reduction in end-to-end time for planning intercont-seat configuration for Lufthansa Short Range fleet (Dean and Rainnie, 2009)
- 30% reduction waiting time by eliminating impediments in the check-in process at European airport by British Airways (Dean and Rainnie, 2009)
- Reduction in backlog in the back office booking processes by 80% (Apte and Goh, 2004)
- Reduced report production time from 70 to 5 days in the Legal company (Ballé and Régnier, 2007)
- Reduced end-to-end processing time from over 200 days to 12 days for IT service function (Apte and Goh, 2004)
- Within hospitals it was reported by using the new procedures for 90 days there was a 90% drop in the number of infections. This resulted in significant savings in intensive-care-unit costs (half a million dollars per year) (Ahlstrom, 2004)

- Reduction in time (97% throughput) resulted in 50% of less space required in nursing homes (Bhatia and Drew, 2007)

Despite the above listed benefits in services, the literature review highlighted that over 70% of service organisations have attempted to implement Lean in the UK with less than 25% achieving success (Wysocki, 2004). Trying to understand the reasons for Lean's low success rate, a number of scholars in the literature put across some criticisms and counter arguments that are recorded as follows:

- **Human aspects:** Panchak (2003) and Swank (2003) observed that Lean can be seen as exploitative and putting a great deal of pressure on front-line workers. They commented that Lean's long-term sustainability has dependency on the people (motivation, empowerment). Wysocki (2004) supported this point and added that Lean is based on respect for people. Lean is not mean

- **Scope and lack of strategic perspective:** Wysocki (2004) highlighted that Lean is used as a transformation programme and results in unsustainable change. He argued that Lean is not a management fad, Lean methodology is tried and tested and it improves daily activity

- **Coping with variability and over-standardisation:** Lucey, Bateman and Hines (2004) argued that Lean can manage variability and utilise assets more effectively. However, they argued that in services, as demand varies Lean's ability to manage supply chains can become the main inhibitor for Lean adoption. Swank (2003) observed that service organisations meet individual customer needs. Therefore, the standardisation of service processes does not fit well with a Lean standard approach. He argued that this points to allegations of "McDonaldisation"

- **Unable to deal with uncertainties:** Lean can eliminate the need for many layers of management (making a Lean structure), which are required to deal with uncertainty (Emiliani *et al.*, 2003; Liker, 2004). Liker (2004) stated that Lean provides higher preference to efficiency over reliability

Bonaccorsi, Carmignani, and Zammori (2011) have observed that Lean has been recognised as a business improvement method and is spreading into services and other sectors. However, through a review of literature, this author has observed that Lean application in services is at the primary stage since the most of Lean literature is dictated by examples related to manufacturing or limited to health services and very patchy for airline services (applying a handful of tools and techniques). In particular, Lean applied as an integrated approach to the business strategy is uncommon. It is viewed that the Lean customer centred approach is obviously attractive for the airline services and, therefore, there is a need for an explorative study to understand the way in which a Lean thinking is applied in this service sector. This point appears to be under-researched.

Since the review of literature highlighted the application of Lean in services focuses on the use of tools and techniques, the main points are included in the following section.

2.2.4.2 Lean tools and techniques

In 2003, Womack and Jones described Lean as a very specific set of interlocking practices, tools, and behaviours derived from a very clear reference model. They noted that Lean supports a number of tools/techniques, for example: Kanban, Kaizen, 5S, Pull scheduling, Waste Analysis. The Appendix A1.2 illustrats most used Lean tools.

A number of scholars have noted that Lean application has heavy dependencies on tools and techniques (Hanna, 2007; Atkinson, 2010; Schiele and McCue, 2011). They warned that Lean is not a toolbox that offers specific tools for a business or process problem, where one tool/technique can be selected by change team and used with an assumption that everything will be resolved.

In summary, the underlying philosophy of these business improvement methodologies have one purpose - to improve business efficiency and effectiveness to increase customer satisfaction and profitability for the organisation, however each

methodology has a different approach. A table in Appendix A1.3 contains a table that higlights the underlying theory, focus, and associated tools and techniques of each business improvement approach discussed above.

The second element of this study is to identify the service characteristics and then examine the services dimensions using some Statistics.

2.2.4.3 Lean thinking in practice

Womack and Jones (1996), Emiliani *et al.* (2003), Liker (2004) and several other scholars have observed that organisations management community considers 'Lean' as an idealistic approach and assume that it is not practical in the 'real world', ignoring a number of claims made by companies who have shown evidently that they have benefited significantly from it. Bowen and Youngdahl (1998); Goland *et al.* (1998); Liker (1998); Lei (2003); Panchak (2003); Swank (2003); Wysocki (2004) all have reported that most services begin with Lean through modest experiments with an aim to improve productivity in their operations. However, Liker (1998) observed the extent to which Lean principles and practices have been deployed and referred these distinctions as 'Real Lean' and 'Imitation Lean'. He defined 'Real Lean' as the authentic adoption of Lean across an enterprise allowing some modifications that suits companies' individual circumstances, but is still consistent with Lean principles. He explained that 'Imitation Lean', however, occurs when a company selects a handful of Lean principles and practices with using tools and techniques in order to obtain short-term gains. These companies ignore the 'Continuous Improvement' and or 'Respect for People' principles (Liker, 1998 p.56). Several other scholars echoed this claim and added that if all that the company is doing is 'Imitation Lean', it will result in Lean failures. They have shared some known comparative concerns and highlighted effects as follows:

- The results of 'Real Lean' are better financial and non-financial performance and its focus is for the long term. Whilst 'Imitation Lean' focuses on short-term gains (Emiliani *et al.*, 2003).

- 'Real Lean' is much harder for competitors to copy as it has Lean principles woven into its culture. Whilst the 'tools & techniques' approach (Imitation Lean) is easy to replicate by competitors. Therefore reducing the chance to gain a competitive advantage. (Liker 1998)

- 'Real Lean' supports both approaches (top-down and bottom-up) and it is strategic in nature. 'Imitation Lean' can do more harm than good since it is a mix of Lean and non-Lean principles, practices and metrics. This can create confusion and as a result most people within the organisation could lose interest and therefore disengage (Emiliani *et al.*, 2003).

- 'Real Lean' is all about people engagement and respect for them. Deploying 'Imitation Lean' is inconsistent with the 'Respect for People' principle that includes employees, suppliers, customers, investors and the community. (Liker, 1998).

Many of these scholars recommended that senior managers/change agents should have a clear understanding of how to deploy Lean into their organisation (Womack and Jones, 1996; Emiliani *et al.*, 2003; Maskell and Baggaley, 2003). They have observed that the viewpoint of some leader's is that it is better to have some improvements rather than no improvements. They further stated that there is a temptation to rush for Lean application in order to obtain quick results, they warned that leaders should not forget to think deeply about the intent of Lean. They added that this will avoid poor results or unintentional aftereffects (Womack and Jones, 1996; Emiliani *et al.*, 2003; Maskell and Baggaley, 2003). Moreover, Panchak (2003) and Wysocki (2004) agreed that if Lean is deployed incorrectly from the beginning, it will weaken the future Lean attempts. To add to this view, Wysocki (2004) commented that the errors will have to be undone, and this will take time, effort and money to re correct the errors which may not be possible.

Lucey, Bateman and Hines (2004) studied a number of organisations who adopted Lean and produced some guidelines for organisations who wish to apply Lean. These are as follows:

- Top management support - Ensure full and on-going support from top management

- Lean champions - Allow champions to drive change initiatives and maintain momentum

- Single thread - Ensure policy and process support for changing existing attitudes, behaviours and practices

- Engagement - Engage employees as much as possible in the planning, initiating, implementing and evaluating outcome of change initiatives

- Trust – create an open and trusted environment by communicating and sharing information often

- Time factor - Lean is a journey. Everyone must realise that it will take a long time

Despite these guidelines, Womack and Jones (2005, p.67) reported that most practicing organisations possessed a basic understanding of Lean (i.e. tool-based) rather than a complete understating of Lean philosophy that includes principles and practices. Agreed with this observation, a number of scholars added that due to this these organisations often miss Lean's intent and create nuances such as:

- They define their corporation's purpose is 'to maximise shareholder value' in a literal sense typically short-term (Okuda, 1999; Emiliani, 2003b; Morimatsu, 2003). They added that this forces zero-sum trade-offs among key stakeholders and creates waste, which is incompatible with Lean principle. Basu (1999) and at a later date Emiliani *et al.* (2003) recommended that senior management should adopt a corporate mission to balances both human and economic objectives

- Toyota (2001) claimed that the appropriate practice of Lean creates negative cutting, such as layoffs. He stressed that this is not the intent of Lean, since it causes wasteful imbalances. He claimed that Lean's focus is to have positive

results of improvement initiative and support stable long-term growth (Toyota, 2001).

- A number of scholars argued that possessing only a basic intellectual understanding of Lean is insufficient (Spear and Bowen, 1999; Liker, 2004; and Spear, 2004). They added that Lean is designed to help workers realise their full potential; therefore Lean principles and practices should be learned on-the-job.

Emiliani *et al.* (2003a) observed that since Lean principles are not widely understood among Lean practitioners, it is therefore not surprising that this thinking is not extended to other key stakeholders, such as suppliers, customers, or investors, resulting in failures to realise the benefits of Lean.

Other scholars such as Alison and Dean (2000), Dahlgaard and Dahlgaard-Park (2006) and Putnik (2012) proclaimed that Lean is the all-encompassing 'mother-of-all-continuous improvement programs'. Dahlgaard and Dahlgaard-Park (2006) added that Lean can be a new synthesis of programs and it would be useful to combine the best features under one initiative to deliver the value to customers with keeping quality in focus. They added that this will then allow customers' satisfaction to grow and loyalty to be built and that will consequently impact the organisation's growth and market share (Dahlgaard and Dahlgaard-Park, 2006). Schiele and McCue (2011) agreed with this sentiment and commented that if an organisation adopts Lean, it will lead to the development of a profitable organisation for many years to come.

2.2.4.4 Lean in airlines

The troubled Airline industry is a classic example that solidifies the fact that Lean can do wonderful things to their bottom line improvement, until oil prices reduce dramatically or other market variables change and offset these savings (Naslund, 2002). Through review of literature, it became apparent that there are three Fortune 500 Airline companies that are using Lean (Delta Air Lines, Southwest Airlines and US Airways Group).

Outside the Fortune 500 there are quite a few examples of Lean in the Airline Industry. Many of these companies are GE Aircraft Engines "At the Customer for the Customer" clients. For example, Air Canada, America West, Qantas Airlines, Air France, Air New Zealand, All Nippon Airways, Atlantic Southeast Airlines (Delta sub), China Airlines, Emirates Airline, Japan Airlines, Thai Airways.

An example of the Lean implementation found in literature was for Alaska Airlines. Alaska Airline's organisation-wide Lean initiatives continue to yield performance gains. At the end of our first year, instead of a 45-minute wait for baggage, they claimed to achieve a 20-minute wait. Their flight cancellation and missed bag rates also went down. They became the number one on-time airline in the country and consistently rated in the top three (www.industryweek.com/articles accessed 2015).

The review of literature also highlighted that Amadeus who is the world's leader in supplying IT solutions for the travel and tourism industry, now insists that before any IT project starts, everything is in place – from staff availability, resources, and server space. This Lean approach means that there are less chances that the project will encounter a "disconnect." By first piloting Lean thinking into corporate culture, it can later provide a simple front-end interface that protects end-users from the complexity in the background.

Nearly two decades ago, Boeing took 71 days to assemble its 777 aircraft. Today, Boeing only needs 47 days to build the 777 aircraft. With dedication to Lean practices and consistent improvement methods, Boeing is able to save time. Above saving time, Boeing has implemented a process to improve company culture and build Lean into everyday Boeing culture. Most Boeing employees are likely to be familiar with the concepts of Lean, supplier relationships, and global manufacturing— supporting a design-anywhere, build-anywhere vision of the future. A lean and efficient operation is the heart of the Boeing Production System and is crucial to Commercial Airplanes' success in the global market place (www.industryweek.com/articles accessed 2015).

2.2.4.5 Lean approach

Lean is recognised as a business improvement approach and as a philosophy it addresses issues of quality, cost and delivery that surfaces in an organisation's business processes (Emiliani, 2003). Jones *et al. (*1999); Spear (1999); Emiliani (2003b); and Morimatsu (2003) suggested that Lean can be applied as a business improvement strategy through integrating sets of principles, techniques and tools. Furthermore, they claimed that Lean supports continuous improvement principle through understanding the customer needs and empowering employees through effective leadership, teamwork and support with problem resolution (Jones *et al.,* 1999; Spear, 1999; Emiliani, 2003b; Morimatsu, 2003). On the topic of empowerment, Spear (1999) remarked that this is unlike other 'solutions' such as automation, computer systems and outsourcing. He reiterated the claim made by Oh -no: "*you can't 'buy' Lean, you have to 'home-grow' it*".

The 'value' and 'results outcome' as two facets of the Lean improvement drive have been selected. The rationale behind this selection is it includes aspects of value propositions and service quality attributes respectively and will be included in later chapters.

In the case study company, Lean is used as a business strategy that applies a three-step approach as shown in Figure 2.2.
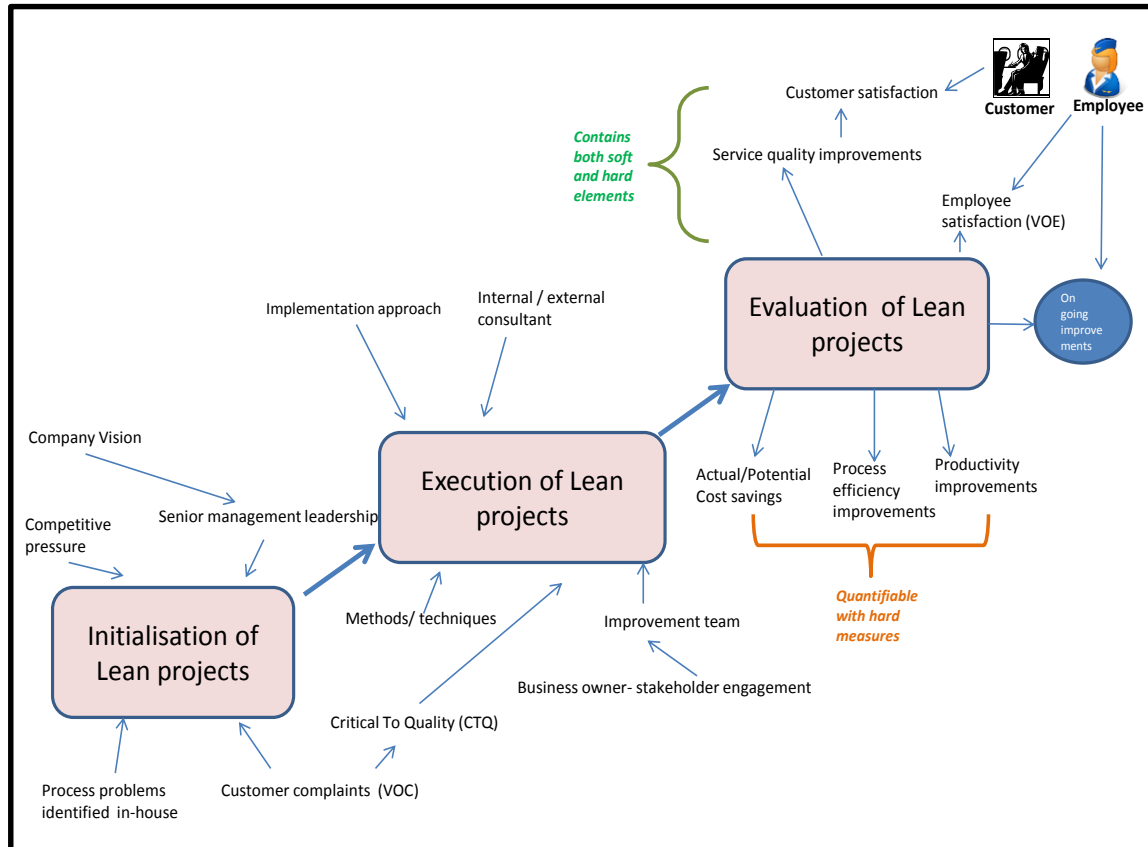
Figure 2.2: Lean approach for improvement initiatives

Andersson, Eriksson and Torstensson (2006) have supported this view as they said that traditionally the three-step approach involves Initiation, Execution and Evaluation. The following sections lists out the key literature within each of the steps to give a grounding for the central theory that is included in the later section.

1) Initialisation of Lean projects

The literature review highlighted that Lean project initiations share four initiation factors and are depicted in Figure 2.2. The First point being that the improvement project is typically initiated by the senior manager or Leadership team member. They communicate the vision and share their enthusiasm. Within the literature it was noted that a number of organisations who initiated Lean,have all concluded that *top management support through engagement* was considered as the most important aspect for starting the Lean project in their organisation. This is in line with Jones and Mitchell (2006) who argued that the top-down management involvement is highly influential for kick-starting the improvement initiative. The Second point is a

highly competitive market pressure as another factor that could put pressure on an organisation to improve their service or product quality and have started an improvement initiative. The third factor could be *high demand and customer expectations* derived through complaints. If the customers' viewpoints are considered as the first priority, service organisations could provide better service experiences and meet their customers' expectations. To gather customer views some organisations for example Big Box Digital, blueyonder, mShop to collect voice of customers (VOC) through a survey. The fourth factor appears to be *team-based improvement.* Ajzen (2011) noted that team members amongst some area of the business feel enthusiastic about the changes to their existing process or come across process problems themselves and propose changes accordingly. They get involved in initiating the improvement and take ownership (Ajzen, 2011). This view is supported by Womack and Jones (2004) as they claimed that Lean is well-suited to an organisation that encourages a less hierarchical management structure and allows its workforce to be engaged and empowered. In a nutshell, an organisation should build a culture that is receptive in understanding the needs of a customer and is able to drive improvement continuously, claimed Womack and Jones (2004).

2. Execution of Lean projects

As depicted in Figure 2.2, there are a number of triggers and influencers for this step. For example, once the Lean project is selected, critical to quality (CTQs) attributes are defined, decision on the Lean project approach is considered as well as roles and responsibilities of the team leading the Lean initiative identified and agreed. The literature review pinpointed that the execution of improvement projects usually follows a framework and most often it mirrors the widely used Six Sigma – DMAIC method. The following few paragraphs briefly discuss the activities at each step.

a) Define or Shape

The first step is to define the critical problems in response to customer requirements. The objective of this step is to shape, scope and define the improvement initiative. The problem is identified and evidence gathered. The company's vision is cross-referenced and improvement objectives are agreed.

The CTQ attributes are identified and translated into a measurable and quantifiable goal for the improvement project. Review of literature highlighted that in order to define the CTQ precisely, three criteria are usually considered. The first criterion is an understanding of the *Voice of the Customer* (VOC), where a survey method is used to gather information. The second criterion is the *Voice of the Employee* (VOE), where a range of methods are used to gather information that can include survey, focus groups and interviews. The final criterion is to align the CTQ attributes with the organisation's strategies. The CTQ are generally reviewed and approved before proceeding to the next step.

b) Measure

The measure step is intended to investigate the existing performance of the operations process in relation to the CTQ defined in the prior step. *Process Mapping* is employed as the first step, identifying activities from the end-to-end perspective. Problems in the operations process are typically highlighted during this step. *It is then* necessary at this stage to justify the critical measures (typical measures in the operations process using the following three categories:

1) Cycle time - The time required to produce a part or complete a process, as timed by actual measurement.

2) Defect rate/delay - Defect rate measurement is defects per million opportunities and is used very frequently in Six Sigma. In fact, Six Sigma is famous for its defect rate goal of 3.4 defects per million opportunities.

3) Resource consumption - is an umbrella term for the many different ways and rates that humans consume the products of the natural world.

After establishing reliable measures, the important step is then to *collect the data.* Several tools and techniques are used including; work study method, value stream mapping, distribution graph and Pareto chart.

c) Analyse

This step seeks to identify the root causes of the problem from collected data and several tools and approaches are used for providing reliable results. For example, Cause and Effect analysis defined by Ishikawa (1976) is used to refine the important variables before analysing through other tools to finalise the critical variable for the improvement process. This approach helps in visualising the end-to-end process through the rich data necessary and justifies the critical areas for improvement in response to business requirement. This step requires high collaboration cross functionally between the improvement team, and the business owner/sponsor. Several scholars have suggested incorporating analysis with data and business requirements, together with human factors, and broaden the range of analysis (Orosz, Miles and Huberman, 1997; Nieto and Perez, 2000; Cunliffe, 2007).

d) Implement

In this step, the analed results are reviewed and used to generate alternative solutions for improvement. The selection of the appropriate solution options are justified with the gathered consensus of related stakeholders.

e) Monitor

After executing the improvement solution, the project team is responsible for developing the process control plan for the improved process. This may be a control chart or the standard operating procedures. Technically, the team monitors the improved process for two to three months before transferring the responsibility to the business owner.

3 Evaluation of Lean projects

The review of literature pinpointed that improvement project results are measured based on three main criteria as depicted in Figure 2.2. Firstly, the results are measured in terms of *internal operation* that consists of both dimensions; the operations process and operations employee. Direct measures such as cycle time reduction, reduction in work in progress, error reduction, and removal of non-value added activities. are some of the operational measures that are in use. The operations employee dimension is generally assessed in terms of work environment, productivity, communication, leadership, attitudes towards Lean and skill development. Secondly, the *customer dimension* is considered to be an important measure for improvement results. However, from the review of the literature, it was observed that less attention is given to measuring the results from the customer perspective. The third criterion is the *cost dimension*. As recorded in Figure 2.2, cost savings are hard, soft and potential savings and the hard and potential savings can be quantifiable in monetary terms.

Agus and Mohd (2012) claimed that for assessing the outcome of improvement initiative, savings in cost is considered as an important criterion. Carlborg, Kindström and Kowalkowski (2013) observed that the top management of organisations who are actively engaged with Lean are interested in results that includes cost saving rather than soft savings that are likely to be considered from both the customer and employee perspectives. They argued that some members of the top management believes that it is hard for customer to perceive the improvement in service quality is a direct result from the improvement initiative; but do agree that the outcomes does affect customers' perceptions (Carlborg, Kindström and Kowalkowski, 2013). This is a significant point to consider and should be examined further. With this view in mind, the second iteration of the literature search was carried out that identified cases for service quality improvements. This second iteration identified a number of cases that are discussed below.

Kumar *et al.* (2009) and Nattapan (2013) investigated the outcome of the quality improvement projects and revealed that the improvement initiatives positively impact

on company performance because it improves operational processes that improves, financial results, and links to customer satisfaction.

However, Robinson (1998) and Antony (2004a) observed that measures for quality improvement initiative may not adequately include responsiveness, empathy, and assurance that are considered as soft aspects of quality and are linked to customers' perception of service quality. However, Antony *et al.* (2007) noted that it is difficult to measure business improvement results for services since it has the special characteristics such as intangibility, heterogeneity, inseparability, perishability, as discussed in section 2.3. But nevertheless they suggested that the internal performance standard and external customer perceptions should be considered in evaluation (Antony *et al.,* 2007).

Efficiency in airlines is noted by a number of scholars such as Douglas and Miller (1974); Graham et al. (1983); Windle (1991); Schefcyzk (1993); Good et al. (1995); Scheraga (2004); and the most recent one Yayla-Kullu and Tansitpong (2013). While all scholars agree to use costs and expenditures as the input, the measure of output (i.e. performance) varies. They noted that the majority of output measures that are in use are capacity measures (load factors) together with financial measures (Revenue Passenger Miles – RPM) (Graham *et al.*, 1983; Truitt and Haynes, 1994; Good *et al.*, 1995).

Review of literature identified a number of case studies that focused on measuring the 'dissatisfaction' of customers using variables such as on-time performance, mishandled luggage, and frequency of complaints (Bitner *et al.*, 1990; Bejou *et al.*, 1996; Lapre and Scudder, 2004; Wyld *et al.*, 2005; Tsikriktsis, 2007; Sherry *et al.*, 2007). However, it is argued that such measures do not have any implications on how the work is done or how it should be done (Wyld *et al.*, 2005; Tsikriktsis, 2007). Moreover, the discussions in these papers are limited to reducing costs. This line of research by and large overlooks the service quality aspect within the aviation sector.

Some output measures focus on how badly the work is done instead of actual customer satisfaction (Dahlgaard and Dahlgaard-Park, 2006). While Sherry *et al.* (2007) commented that it may be important to measure how 'badly' the work is done,

it is more important to measure how 'well' the service is delivered (Sherry *et al.*, 2007). It can be assumed that customers' actual experience builds a firm's image, especially in the airline services. However, it is particularly critical to make sure that passengers have a good experience even when there are no significant failures (e.g. delayed flights, lost luggage, and complaints). This is in line with by Wyld *et al.* (2005) comment which suggests that element should be considered for evaluating airlines' efficiencies based on customer-perceived service quality measures (Wyld *et al.*, 2005; Sherry *et al.*, 2007).

The review of literature pinpointed some examples where researchers studied the Lean improvement outcomes on customer satisfaction. For example, Crosby (1991) researched improvement initiatives in a service firm and explored relationships between improvement initiative with customer satisfaction; Boaden and Dale (1993) studied UK financial companies and highlighted some key aspects of quality improvements considering customer's view; Roth and Jackson (1995) reported the banking companies on how improvement initiatives were adopted in the sector and assessed how aspects of both technical and functional quality have been improved. Lately, Maddern and Maull (2007) examined UK financial services and developed a generic model to measure BPM effectiveness that impacts on customer satisfaction.

According to Deming (1986) an improvement made to business process should result in lower costs and an increase in customer satisfaction. Rust *et al.* (2002) agree and confirmed that business improvements can reduce cost and improve customers' satisfaction this ultimately leads to an increase in revenue for the company. Although there is an agreement in the literature that such relationships do exist, but no explanation is provided on the relationship(s) between Lean and its results.

Many scholars have noted that service quality has become a prominent approach within service organisations (Newman *et al.*, 1998; Harvey, 1998; Maddern, Maull, and Smart, 2007; Bouranta, Chitiris, and Paravantis, 2009). Service quality is a commonly used output measure in other service industries, including banking (Roth and Jackson, 1995; Soteriou and Stavrinides, 1997; Soteriou and Zenios, 1999;

Metters *et al.*, 1999; Kamakura *et al.*, 2002; Metters, Frei and Vargas, 1999), marketing (Parasuraman, 2002; Ayanso and Mokaya, 2013), B2B services (Bigné, Aldás and Andreu, 2008), maintenance (Backhaus *et al.*, 2011), hotels (Amy, Alison and White, 1999), and airport operations (Fijorek and Lesniewska, 2012).

Soteriou and Zenios (1999) studied how the operational characteristics of services translate into customers' perception of quality. Likewise, another study carried out by Buavaraporn and Tannock (2013) that focused on service quality principles and explored how financial institutions in Thailand adopted various business process improvement methodologies to improve their service quality. They concluded that service quality principles are applicable to a number of business improvement approaches, including Lean (Buavaraporn and Tannock, 2013).

Despite claims made by a number of scholars (e.g. Hines *et al.* (2004); Womack and Jones (2005)) who stated that there are strong links between improvement initiatives and its results. However, within the literature relatively limited empirical research has been found that verifies and validates these relationships. For change manager, understanding the relationships between improvement initiatives and their outcomes would be of interest since this awareness can assist them to select improvement initiatives that have the greatest impact (Kordupleski *et al.*, 1993). However, within the literature it appears to be a gap for a comprehensive theory that explains how to link Lean outcomes to service quality and evaluate the improvement results. This gap identifies a need for enhancing the understanding of relationships between Lean initiatives to its results, and evaluating improvement results. Therefore, it is argued that a research that considers the important aspects of service quality principles and identifies relationships between improvement initiatives to the outcomes at the operational level could address the gap within the literature. This supports the observation that improvement in service quality is increasingly important to enhance competitiveness in airline services. This customer-contact service quality angle has not been rationally addressed in literature of Lean services.

The above section discussed Lean application in services, the following section outlines various barriers that have been identified in Lean literature that could hinder Lean success within organisation.

2.2.4.6 Lean barriers

Hazlett and Hill (2000) and Silvester, Lendon, Bevan *et al.* (2004) carried out studies in private and public service sectors and highlighted a list of barriers that can hinder Lean deployment. These are discussed below.

Lack of understanding in variation impact

McLaughlin (1996) debated that there is a greater variability in services when compared with manufacturing. Silvester *et al.* (2004) evaluated Lean in the National Health Service (NHS) and examined the queues for NHS services that more likely in patient backlogs and or waiting time. They argued that this is due to the variation between demand and capacity. They claimed that not considering process flow leads to gaps in capacity planning. They proposed to use the Lean principle of 'flow' to properly understand and reduce waiting time for patients (Silvester *et al.*, 2004).

Lack of 'buy-in' from staff

Narasimhan (2003) reported that there is a decline in the importance of continual improvement after the first initial successes gained in Lean literature. He claims that the fifth principle of Lean is to make improvement continuously. One of the main barriers to the decline is a lack of interest from the internal customer. Reading through more literature on this topic, it became apparent that for continuous improvement to be ongoing, employee engagement and commitment for improvement on a continuous basis is of paramount importance. This point is underpinned by Buhler (2006) who argued that engaged individuals willingly help achieve an organisation's goals and are emotionally involved in the tasks of their organisation. He has commented further that having an engaged workforce in the improvement initiative is vitally important because research has shown that engaged workers sustain improvements and, as a direct consequence, an organisation can reap benefits, such as increased efficiency, higher productivity

and an increase in customer satisfaction. In general terms, it has been accepted that internal customer (employee) engagement leads to their satisfaction, which in turns leads to external customer satisfaction.

The term 'internal customer' is defined in this thesis as a person(s) who can be within the department of the company or another company that is involved in co-producing products or services. This is in line with the explanation proposed by Richards (2012, p56) which they further clarified as below:

> *"An employee of the organisation, who is participating in creating, maintaining and delivering the products/services to the end customer who is either purchasing and or receiving the services."*

To date, relatively little academic and empirical research has focused on the Lean adoption and its effect on employees' engagement and their satisfaction. Drake, Blake and Swallow (2009) claimed that employee engagement is a critical element for gaining a commitment to sustain the embedded improvements and also continuously improve them.

To elaborate on this point, the scenario whereby the customer service agent delivers airline service improvements made at the check-in process considered – an experimental study carried out by Patti (2013). The performance in relation to check-in activities that is being delivered by the internal customer (in this case the customer service agent) can either increase end customer satisfaction or decrease it, impacting on the end customer perceptions of the service offered. Patti (2013) claims that the service improvement executed by the employee (in this case the customer service agent) depends on how engaged the employee is and it can also be seen as a sign of employee satisfaction. Therefore, the service offered can be a detrimental factor for the customer in gauging the service quality and may be linked for them to remain loyal to the service provider (Patti, 2013). The loss of a single customer's loyalty can cost an airline in monetary terms for repeat business and its reputation; thus every interaction is crucial for the service organisation (Patti, 2013).

Company culture

Swank (2003) noted that it has been highlighted that the Lean approach is surrounded by people issues. For example, it was assumed by unions that Lean intensifies the work effort, increases management control and undermines trade unions interdependence and this was fed back to employees. As a result employees were not engaged to work for improvements initiative.

Issues with unions

In an article published by Flint in August 2004, Perry Flint examined how American Airlines has seen dramatic improvements after implementing Lean. The teams in their components and avionics shop helped to reduce inventory requirements ($1.4 million) at the same time 11,000 sq. ft. of floor space was vacated. Flint (2004) observed that these improvements have been made possible through employee and union buy-in and the creation of employee-led work teams, and American Airlines realised the benefits, after implementation, of employee-recommended improvements. As noted by Rijnders and Boer (2004), who observed that in the service sector managers and staff like to have quality outcomes for their services, but they have a different understanding for process quality. They argued that quality initiatives responses may be contradictory and therefore create confusion for process and its results (Rijnders and Boer, 2004).

Disconnected targets

In the literature review, there was an example of an aerospace company who experimented with TQM, Quality (KoalaT) Circles, and Six Sigma, Just-In-Time (JIT), and Lean programmes. It was highlighted by Saha and Theingi (2009) in the literature that Lean was pushed much harder by some of the company's management than the earlier programmes were and therefore, achieved the status of Lean as a cult religion. They stated that individuals who embraced the program, or just wanted to please management, got on the 'Lean bandwagon'. Some who resisted being 'assimilated' by the Lean 'organism' were reassigned, marginalised or even terminated. The management accepted or embraced these programs because

they promised reduced costs, since the programs were marketed for profit and did not always have positive or enduring effects on quality (Saha and Theingi, 2009).

Leadership style

Reviewing several articles listed on the lean.org website pinpointed cases where it is concluded that leadership can play a part in implementing Lean successfully. The discussion in some cases suggested that the successful implementation of Lean is dependent on the management and senior leadership of an organisation fully committing to the idea. Some observers from the Lean Institute have suggested that business leaders should consider the 'burning ledge' to force the adoption of new ways of thinking (http://www.lean.org).

A number of scholars such as Ransom (2008), Cocolicchio (2008), and Ballé and Ballé (2009) have claimed that managers have to recognise that there is no simple formula or directives to follow that guarantee success. Ballé and Ballé (2009) added that Lean needs to be viewed as a developing discipline and dynamic, since it is constantly improving. They claimed that their study has shown that there is a high association between the 'sustainability' of improvements with the best performing organisations. They stressed that Lean requires considerable commitment and effort (Ballé and Ballé, 2009).

Lack of clear customer focus

Lean is defined as a customer-centric philosophy; it is about managing resources to be more productive and more flexible, and customers and employees are both important for the success of its implementation (Womack, Jones and Roos, 1990). According to Jones *et al.* (1999) 'Lean' identifies the fact that the *"customer will not pay for the mistakes, but only for the value of the product or the service they receive".* The impact on this thinking is huge on any company's business process. It changes the way people view their business processes (Jones *et al.,* 1999).

General belief that staff are undervalued

Lean's focus should be to change the way work is executed so that a team member's job becomes not only more efficient but also easier (Womack and Jones,

1996). They went on to say that Lean requires an understanding of the thinking of Lean. They stressed that this requires an evaluation element, such as performance measurements, to reflect achievements and drive appropriate behaviour. They added that the cultural aspects of Lean is more important than the application of tools and techniques. Atkinson and Nicholls (2013) stated that culture can be viewed as the personality of an organisation. They agreed that culture comprises of assumptions, values, norms and their behaviours. Therefore, they suggest that any introduced improvement change needs to be non-threatening and should be encouraged for gaining higher efficiency and a higher quality of work. They recommended that any jobs should be aimed at teamwork and the overall aim must be to create 'people-centred' Lean environment (Atkinson and Nicholls, 2013).

2.2.4.7 Lean mystery

Womack (2004) argued that just because Lean appears to be simple to understand and can be applied more easily than the Six Sigma approach (which requires knowledge of statistics), it doesn't mean it is easy to adopt. To achieve this, he argues that organisations should devise a structured framework for achieving the discipline with a sharp and clear focus for its success. He further stressed that having the structured framework doesn't guarantee Lean success, but he explains that it does build some foundation skills, and assists in establishing a business improvement strategy, which can then be adopted through absorbing Lean principles into the company's culture. He argued that this is necessary for a large organisation that is striving for a cultural change. This viewpoint was agreed by a number of scholars such as Bicheno and Holweg (2009), Atkinson (2010) and Saurin *et al.* (2011).

Andersson, Eriksson and Torstensson (2006) observed that Lean is a concept that addresses quality, cost and delivery. It has interlocking principles, techniques and tools. Lean is a philosophy and contains softer elements such as leadership, teamwork and respect for people (Andersson, Eriksson and Torstensson, 2006).

Atkinson (2010) claimed that Lean is a commitment made by an organisation's leaders to address the company's competitiveness. He argued that Lean can be used as a strategic approach for resolving organisational problems and can reduce cost. It can be used as a top down approach or as a smaller discrete and iterative initiative using a bottom-up approach within the organisation. He recommended the desired route is a 'top-down' approach since it has a major impact and provides support to an improvement team who are engaged to drive improvements (Atkinson, 2010).

Cocolicchio (2008), Hines *et al.* (2008), and Dalal (2010) have all agreed that any business improvement strategy, regardless of its strengths, will not be accepted if it is outside the bounds of an organisation's culture as previously mentioned that culture is defined as the values and behaviours that contribute to the unique social and psychological environment of an organisation. This was further stressed by Dalal (2010), who stated that it is imperative that Lean is engrained in the organisation, and that Lean needs to be witnessed as a business philosophy and should not be viewed in a narrow sense as a set of tools, techniques and ad-hoc practices but as a holistic approach engrained into the fabric of organisation with a long-term commitment underpinned by employee satisfaction (buy-in). However, Konrad (2006) argued that mastering Lean's softer side is challenging as it forces a change to the mind-set.

Laureani and Antony (2012) have observed that over the last two decades, Lean along with Six Sigma have become the prominent business-improvement practices and these have been adopted by many service organisations. They noted that many organisations have integrated operational tools and techniques such as just-in-time, statistical analysis - a "hard" side with the "soft" side (i.e. Leadership, team work, and training, communication) in order to identify and make efficiency improvements. This links and aligns the boardroom with the shop floor, building the technical and interpersonal skills and realising efficiency benefits for real (Laureani and Antony, 2012).

Atkinson (2010) argued that ignoring the softer angle for Lean improvements does reduce the chance of its success. The review of literature highlighted an example recorded by Atkinson (2010) where an aerospace manufacturer`s aim was to grow sales through improving production. Lean experts within the company were leading the initiative and they identified productivity-enhancing opportunities. A number of employees received training with the new approach, however, management ignored the softer side of the change and thus this created difficulties. Atkinson (2010) claims that this is a prime example of a situation where some companies underestimate the level of senior-management involvement and appreciation of the people side of change that is required for Lean to be a success. He observed that responsibility is most often delegated to Lean experts who are skilled (technically) but they lack the authority to embed change.

The Lean mystery has been described as having different approaches, style, structure, culture, internal measures, external measures, capabilities to deal with change barriers and all of these have a different impact on the outcome of Lean initiatives. Furthermore, evaluating the impact on service quality, which is inherent within a business process, and it is therefore difficult to define a framework that includes different elements and relationships amongst the elements that could impact the outcome of service quality improvements. It may well be the case that to define a framework it is necessary first to understand how and where Lean strategy is being applied.

The subsequent section, the relevant aspects of Lean, service quality attributes, influences and outcomes are defined and depicted as part of a conceptualised framework and it references the literature discussed earlier.

2.3 Service definition

According to data published by the OECD (2011), the service sector represents 80% of the US economy, 70% of Europe, 62% of Japan and 73% of the UK economy.

However, in terms of Lean adoption, it is claimed that the service sector lags behind the manufacturing sector (Wysocki, 2004; Atkinson, 2010).

The following few paragraphs contain some well-known scholars' definitions of services.

> *"A service is an activity or series of activities of more or less intangible nature that normally, but not necessarily, take place in interactions between the customer and service employees and/or systems of the service provider, which are provided as solutions to customer problems."* (Gronröos, 1994).

> *"A service may be defined as a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit."* (Hill, 1977).

> *"A service is any act or performance that one party can offer to another that is essentially intangible and does not result in ownership of anything. Its production may or may not be tied to a physical product."* (Kotler and Bernard, 2003).

Review of literature also identified classification of services in the literature proposed by Bicheno (2007) who has categorised services according to the two dimensions in a service process matrix. Bicheno (2007) claims that this can significantly affect the way service is produced and delivered and argued that services can be differentiated in four general types. These are characterised as follows (see Figure 2.3).
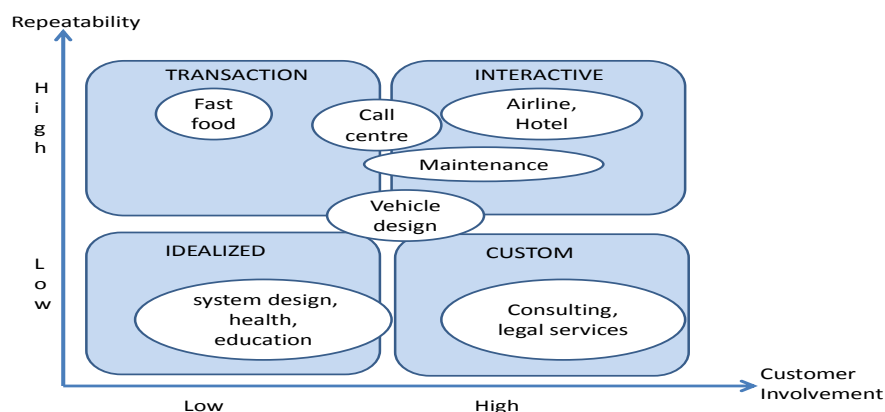
Figure 2.3: Service process matrix

Source: Bicheno (2007)

1) Idealized type – this classification of service requires low customer input and low recurrence, for example (re)design of IT systems or a security system project.

2) Custom type - this classification of service requires high customer involvement and low repeatability, for example management consultancy or legal advice. In this service type, the end goal is often clear but the approach is not. Thus a high degree of interaction between customer and provider is required.

3) Transaction type - this classification of service requires low customer involvement and high repeatability. This type of service is similar to manufacturing where the degree of customer interaction is low. The potential to standardise the procedures is high. For example the call centres or back office operations in insurance or banking, administrative activities in the healthcare firms.

4) Interactive type - this requires high customer involvement and high repeatability. The customer gains satisfaction through the whole accumulation of experiences of interactions with the provider. Examples are hotels or airlines.

Nankervis (2005) argued that rather than classification, services can be seen as a goods-service continuum. This is shown in Figure 2.4 and discussed in detail as follows.
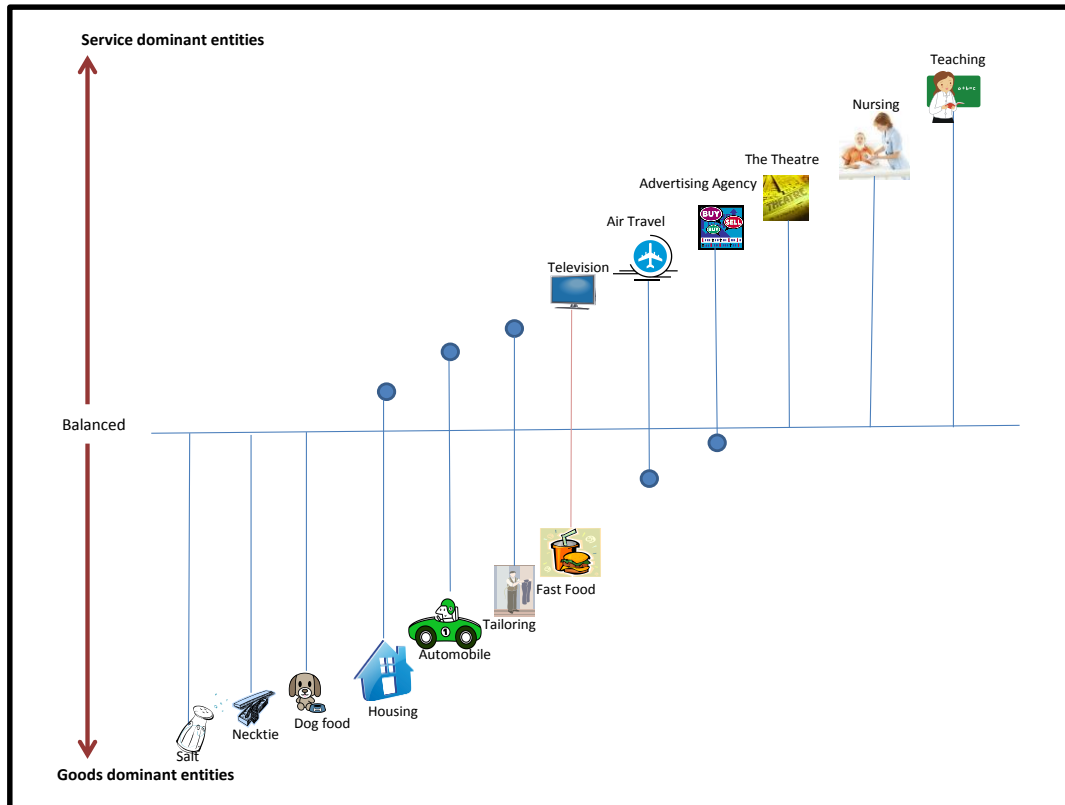
Figure 2.4: The Goods-Service Continuum

Source: Nankervis (2005)

Figure 2.4 above shows that goods that have no related services are positioned at the pure goods end of the continuum. At the pure services end are services that are not associated with physical products. Products that are a combination of goods and services that fall between the above two ends. For example, goods such as tailoring, which require accompanying services such as the measuring and delivery of clothing, are situated near the centre. As seen in Figure 2.4 above, there is a wide-range between the 'pure' service and the 'pure' goods and airline services are placed just above the fast food service which is labelled as a balanced entity.

This research study made a few observations on the goods-service continuum model. It offers a range from pure goods to pure services. Goods are tangible and are very easy to evaluate by the consumer (like fabrics, a house), however, a consumer may find it difficult to evaluate services because of their intangibility (like nursing, teaching).

The service literature identified four service characteristics that are most commonly cited. These are "Intangibility"; "Heterogeneity"; "Inseparability" and "Perishability" (named "IHIP"). The following few paragraphs discusses these characteristics briefly, considering airline services in context.

1) *Intangibility of services*

Moeller (2010) argued that services cannot be widely displayed for customers to see, feel, touch or weigh before deciding whether or not to buy, although it is possible to make some assessment based on past experience, word of mouth, or even the location and decor of the service vendor. He argued that services are not palpable, material or substantial: a product is a good, a device or a thing, whereas a service is a deed, a performance or an effort. The intangible nature of most services gives rise to special problems both for suppliers and consumers (Moeller, 2010).

Referring to the goods-service continuum model (Figure 2.4), airline services have both intangible and tangible aspects, but it can be argued that they are more potentially intangible in some aspects than in services where a substantial tangible element is involved (e.g. restaurants). Typically, an airline transaction involves the processing of information, resulting in these intangible characteristics of services. Lovelock and Gummesson (2004) stressed that a service's intangible characteristics can cause difficulties in measuring that service objectively.

2) *Heterogeneity of services*

Moeller (2010) argued that the delivery of services invariably includes a large measure of the human element. The view is that for airlines, standardisation of a service can be achieved to a certain extent and the skills of the suppliers are essentially purchased. Because of this, it is difficult for both suppliers and consumers to ensure a consistent service delivered each time and therefore services provided often appear inconsistent for airline services. This view is in line with Lovelock (1983).

3) **Inseparability of services**

Moeller (2010) noted that service provision and provider are inseparable from the service consumption and consumer and the service must be consumed at the point of provision. Lovelock and Gummerson (2004) and Vargo and Lusch (2004b) have also agreed with this statement.

The provision of an airline service may not necessarily be inseparable in its entirety. However, there has been a recent trend for airlines to replace front office customer-facing staff with computer terminals to facilitate processes such as printing boarding passes and seat selection.

4) **Perishability of services**

Moeller (2010) observed that in general services cannot be stored, stockpiled and carried forward to a future time period, thus they are time-dependent and time-important, which makes them perishable. He explained that the issue of perishability is primarily the concern of the service producer and that the consumer only becomes aware of the issue when there is insufficient supply and that they have to wait for the service (Moeller, 2010).

The systematic review process indicate that airline services do indeed have a limited degree of perishability (e.g. services provided in flight) but some elements of services can be considered imperishable.

The section above discussed known service characteristics; the following section discusses the view points from managing a service.

2.3.1 Service management

The characteristics of services as discussed in the service literature that indicates that service processes have characteristics and because of that they provide strategic and operational challenges. Apte and Goh (2004) stressed that service processes are more complex and complicated when compared with manufacturing.

On the same topic, Moeller (2010) added that service processes are invisible in nature and therefore it makes them difficult to manage.

Wolak, Kalafatis and Harris (1998), and Verma (2000) observed that in service processes it is not possible to look for material flow and to track at any point in time. Verma (2000) added that due to the individual requirements of customer request for service or sudden changes to their requirements to services requires accurate planning and flexibilities.

In airline services, the service provider and the service receiver (customer) both are co-producers of services as can be shown in Figure 2.5. Employees of the airline services interact directly with a customer with minimum input from the service manager in that instance to intervene. In this manner customer expectations and satisfaction are prone to be subjective and difficult to measure. These observations are similar to Soteriou and Zenios (1999); MacKenzie-Williams (2003); Listes and Dekker (2005); Mahour and Fini (2010) who argued that determining a robust airline services and dynamic composition of airline operations requires employee engagement and it is the key to improving performance.
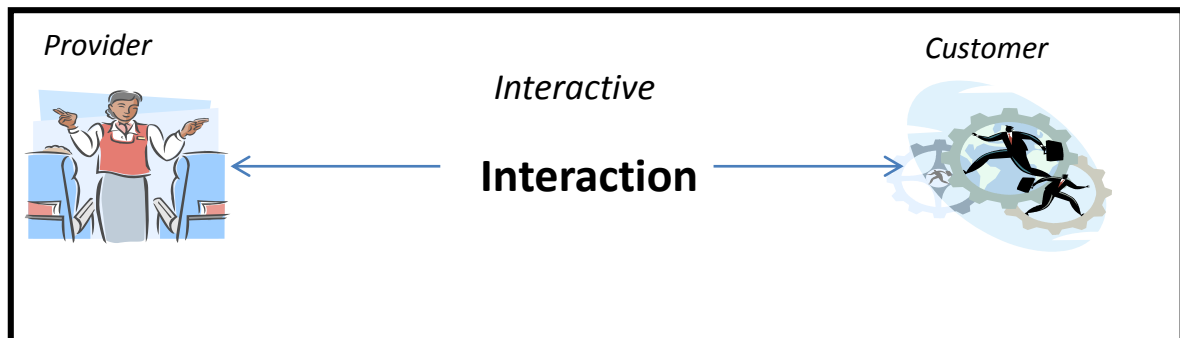
Figure 2.5: Provider and customer interaction

Source: Gummesson (1998)

A number of scholars have claimed that offering service with a quality can be a key driver in gaining competitive advantages and this has supported quality improvement practices to be adopted in this sector (Roth and Van, 1991; Collier, 1991; Newman, 2001; Maddern and Maull, 2003; and Blake and Eash, 2003).

Gummesson (1998), and at a later date Psychogios, Atanasovski and Tsironis (2012) stated that *service quality* is very difficult to measure since these measures

have to be defined at each step of the service process and requires special attention when it is measured.

Grönroos (1988) explained that customer's perception of the service action has both technical quality and functional quality dimensions. Therefore he stressed that 'what' a customer gets but also 'how' customer gets it, both have to be understood. It is therefore important that both of these aspects are distinguished since customers perceive both, explained by Harvey (1998). However, reviewing the service literature, it is concluded that there is still some confusion in this area and this has not been easy to understand. In attempt to understand the underlying implications of service quality, views from a number of scholars were collected and summarised in the Table 2.2 below and discussed the service quality literature in the section 2.3 in detail but prior to that service challenges have been described in the section 2.3.2.

Table 2.2**:** The service quality dimensions

Quality Dimensions	Grönroos (1984)	Parasuraman *et al.* (1985)	Lehtinen and Lehtinen (1991)	Oliver, Rust and Varki (1997)
'What'	Technical service quality (TSQ)	Outcome quality	Output quality	Service product
'How'	Functional service quality (FSQ)	Process quality	Process quality	Service delivery

Source: Kang and James (2004)

2.3.2 Service challenges

Graban (2008) noted that service processes tend to be large and complex. Typical examples within airlines are procurement of fuel, service engineering for airplanes. These processes not only cut across functional silos but also geographies. Managing such a large process requires integrating a large number of stakeholders from all sub-processes and engaging them. He claimed that mapping the end-to-end process and identifying improvements requires a high level of engagement and commitment from various levels of stakeholder to make it happen. As mentioned above that service processes are invisible. Consequently identifying any improvements does require a high degree of skill, argued by Ehrlich (2006). He stressed that one needs to look for things such as work-around, manifestations of complexity to effectively identify improvements in services.

Swank (2003) claimed that service processes are people-intensive. He stated that this brings in the task of aligning all individuals directly or indirectly associated with the process on the improvement goals. To support with the people-intensive viewpoint, Graban (2008) commented that Lean services goals contains both tangible and intangible components and intangible elements are dependent on people, getting consistency could add additional pressure on to service provider.

This author believes that the service challenges listed above are equally valid for airlines. It is fair to suggest that Lean service improvement is filled with trials and tribulations, and it requires an open mind that is ready to explore and experiment.

2.3.3 Service quality improvements

Edvardsson's (1998) stated that service quality improvement's central goal is have an effective business processes that enables to deliver appealing customer outcomes. Harvey (1998) studied a number of service quality improvement approaches and concluded that the approach should deliver both; a good 'process'

through which customers obtain the delivery of a service and good 'results' to customers.

De Jager and Zyl (2013) and Nattapan (2013) observed that service quality is becoming increasingly important in industries with a high level of customer involvement. They stressed that the improvement focus should not be on only for improving internal processes but it should include the broader perspective and embrace the results delivered to customers through processes. On this same topic, Roth and Van (1991), Collier (1991), and Kordupleski *et al.* (1993) have observed and consequently claimed that quality programmes usually concentrate on improving internal processes and define their measures accordingly and does not extend to include external customers. For example, customer perceived quality or customer satisfaction measures do not frequently show nor effectively linked to the improvement efforts.

Review of the literature highlighted that when an organisation simultaneously pursue improvements in both functions (internal focused processes and external focused processes), they achieve a stronger position in their market. This highlights the fact that understanding the relationships between internal and external functions is of paramount importance and should be considered when initiating improvement efforts, resulting in bottom line improvements. Roth and Jackson (1995) and Soteriou and Zenious (1999) carried out a study and concluded that two relationships exist; 1) operational efficiency that links to the organisation's profitability, and 2) operational efficiency that links to service quality perceived by customers. These similar findings were also highlighted by Nattapan (2013) whose studies of the financial institutions confirmed the importance for operational performance dimension and added that this dimension drives service quality improvements, customer satisfaction, and profits for a service company.

From the critical review of the literature it appears that there is a continuous challenge faced by a service organisation who wants to make an improvement to their service quality. This author thinks that this is a clear cut theme which has not been explored in the service literature that therefore, presents an opportunity to

enhance the knowledge on Lean used as a business strategy to improve service quality for airline services.

As it appears that service quality perceptions are based on multiple dimensions, claimed by Brady and Cronin (2001). Within the literature, a number of frameworks are proposed for measuring service quality dimensions that includes: two-dimensional (Grönroos, 1988), three-dimensional (Lehtinen and Lehtinen, 1991) and the five-dimensional SERQUAL (Parasuraman *et al.,* 1985).

Reviewing the service quality literature brought to light the fact that the SERVQUAL framework does not measure the service outcomes whilst reviewing Grönroos' service quality framework, it was noted that measures for service results were not considered. However, these theories appeared to be relevant to this study and therefore these two frameworks have been included to cover the theoretical underpinnings for this research. The following sections include discussions regarding these two frameworks in more detail.

2.3.3.1 Service quality - Grönroos' framework

Grönroos (1988 & 1994) service quality framework includes two dimensions – 1) technical and 2) functional. It represents the view on both, *how* the quality is perceived and in *what* way it is influenced. The Figure 2.6 is a pictorial representations as shown below.
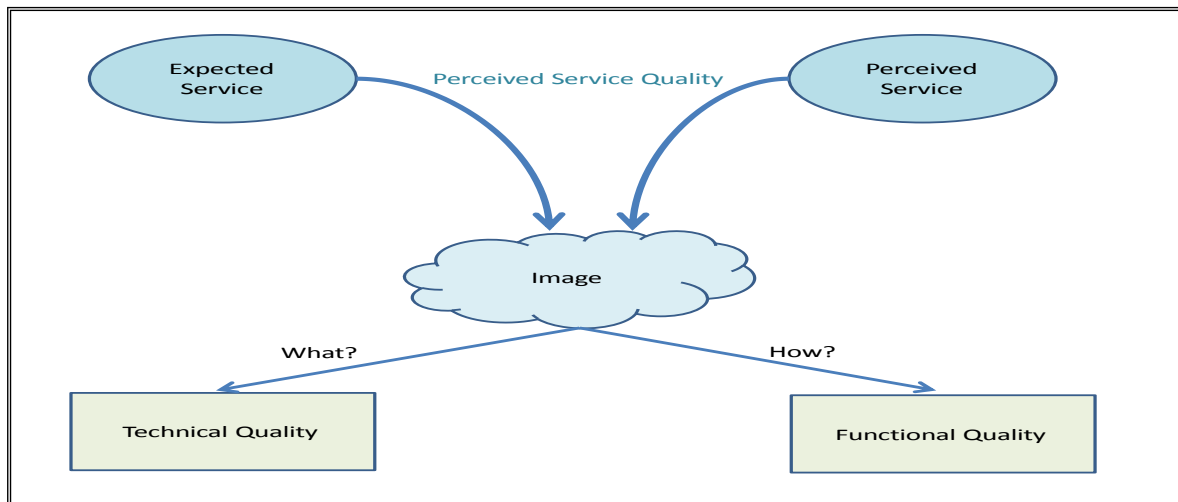
Figure 2.6: Grönroos' service quality framework (1988)

Technical service quality (TSQ)

The TSQ dimension represents 'what' the customer receives as service interaction and can be considered as a result of the product/service production process (Grönroos, 1988). This definition is further supported by Brady and Cronin (2001) who added that TSQ is important for evaluating service quality. Richard and Allaway (1993); Powpaka (1996) have noted that there are no hidden variables related to the TSQ dimension.

Functional service quality (FSQ)

Grönroos (1988) claimed that FSQ affects people's perception of service quality and is therefore considered a very important dimension. It refers to 'how' the service was delivered. Grönroos (1988) studied a number of service firms in Sweden and the study concluded that TSQ is required but it is not be a necessary requirement for high service quality. This implies that FSQ is likely to be more important than TSQ from customer's perspective. Johns (1993) and Johnston (1995) both agreed with this point of view and added that FSQ attributes contributes more to customers' overall service quality perception.

Grönroos' service quality framework was examined by Brady and Cronin (2001) who investigated the links between the TSQ and FSQ dimensions. They confirmed that customer perception and overall service quality are both impacted by TSQ and FSQ.

Several other scholars such as Woodall (2001), Kang and James (2004) and Kang (2006) all agreed and added that this in turn influences the customers' level of satisfaction and is an important determinant of overall service quality.

Seth, Deshmukh and Vrat (2005) compared TSQ and FSQ dimensions and concluded that FSQ can influence perceived service quality to a sgreater degree than TSQ and concluded that functional quality influences the perceived service quality at a greater degree.

Jen, Tu and Lu (2011) empirically examined how service quality influences customers' perceptions of value and their willingness to make a purchase. They confirmed that FSQ has a greater influence than TSQ on purchasing decisions, but TSQ and FSQ can be perceived by customers in the same instance.

Two studies were carried out by Maddern *et al.* (2007) and Kumar *et al.* (2008b) to assess the impact of business process management on service quality within the UK. Their findings revealed a strong correlations between business processes and TSQ and they confirmed that TSQ is critical for service quality and can be considered a key driver to customer satisfaction.

2.3.3.2 Service quality – SERVQUAL framework

Parasuraman *et al.* (1991) claimed that the SERVQUAL framework, widely known as PZB provides an understanding on how customers perceive the service quality and it uses five distinct dimensions to assess these perceptions. The following Table 2.3 includes these dimensions, provides definitions and to put it into this thesis subject, asks the kinds of questions that can be considered, which are included below.

Table 2.3**:** The SERQUAL dimensions

Dimension	Definition	Examples of questions airline customers might ask
Reliability	Providing promised service	Is my flight on time?
Tangibles	Facilities, equipment, and appearance of service personnel	Is the plane, the gate, the baggage area clean? Is service provide appears professional?
Responsiveness	Taking responsibility / ownership to provide service and willing to see the response is prompt	Are the flight attendants willing to answer my questions?
Assurance	Knowhow, ability and consideration of employees	Are the ticket counter attendants, flight attendants and pilots knowledgeable about their jobs and functions?
Empathy	Caring, personalised attention to customers	Do the employees recognise my need for special seating, meal, baggage, transfer or rebooking?

Source: Parasuraman *et al.* (1991)

Parasuraman *et al.* (1991) explained that SERVQUAL supports a broad range of applications and proclaimed that this framework can be used to understand the perceptions of target customers both externally as well as internally. They insisted that SERVQUAL provides a measurement of service quality (Parasuraman *et al.*, 1991).

Kang, James and Alexandris (2002) have used SERVQUAL to evaluate a university's internal service quality and confirmed that all five dimensions were distinct and conceptually clear. They concluded that the dimensions of reliability and responsiveness in their case had much more influence on the overall perception of service quality.

Saleh and Ryan (1991) reviewed literature of the example services from the hospitality sector, who had applied the SERVQUAL framework. They observed that

in comparison functional quality appeared more important than technical qualities (Saleh and Ryan, 1991).

In the literature, a number of scholars have identified weaknesses in the SERVQUAL framework. They specified that the functional quality dimensions have more focus than the service delivery (Mangold and Babakus, 1991; Baker and Lamb, 1993, and Woodall, 2001) argued that SERVQUAL was devised to measure customers' perceptions and added that this framework only utilises the process quality attributes (functional service quality) and has low predictive validity. Richard and Allway (1993), Powpaka (1996), and Lafferty and Colgate (2001) commented that because of the shortfalls, SERVQUAL may not be all inclusive approach for assessing the service quality.

Considering the purpose for this research is to know how Lean improvement initiatives help to enhance service quality. From the above discussions, it can be assumed that service quality is comprised of both TSQ and FSQ. The review of literature pinpointed that there had been limited academic research examining how Lean initiatives affect TSQ and FSQ. It is viewed that there is a need to carry out an empirical research in order to develop a greater understanding of this relationship. This author believes that Grönroo's proposition is more closely linked to this study and therefore has deepen academic understanding in this area.

2.3.4 Evaluating service quality improvements

Rust *et al.* (1995), and Zeithaml (2000) have claimed that in the manufacturing sector improvements have resulted and quantified as reductions in their cost. However, Kordupleski *et al.* (1993), Soteriou and Zenios (1999), Zeithaml (2000) and Rust *et al.* (2002) claimed that the service quality improvements are not so easy to quantify (on profit and other financial outcomes) for services and it is infect an important concern for service organisations.

Heskett *et al.* (1994) developed the service profit chain (SPC) which is a linear framework that connects internal service quality with external service quality,

including employee and customer satisfaction to an organisation's revenue growth and profit (Heskett *et al.*, 1994); see Figure 2.7.
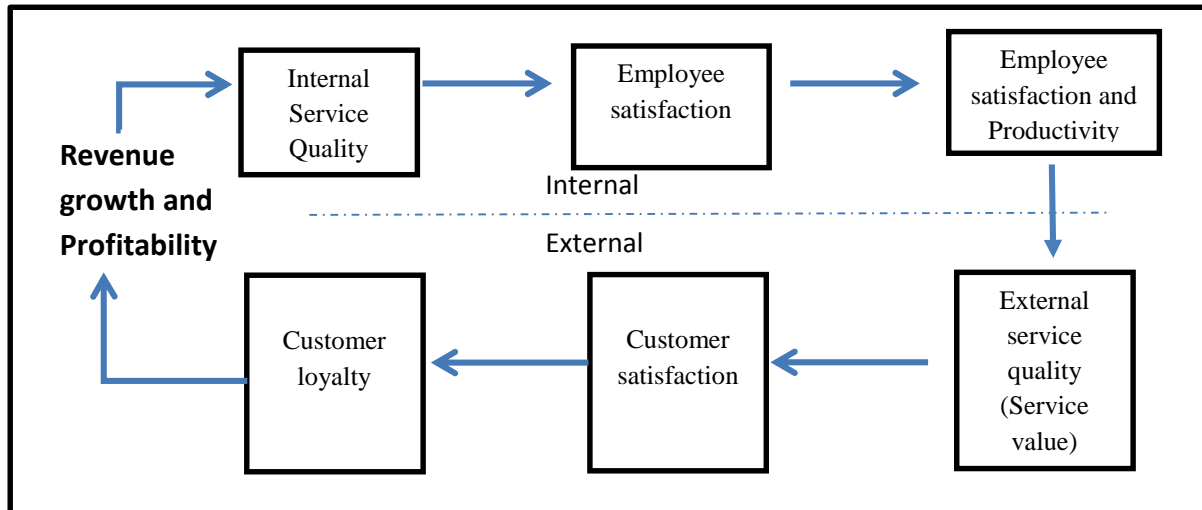
Figure 2.7: The SPC chain

Source: Heskett *et al.* (1994)

Heskett *et al.* (1994) pointed out that the SPC employee and customer both play a key role in driving a firm's profitability. The SPC framework supports, defines and measures service quality and links with internal and external views of the business performance improvements. Using the analogy of the 'satisfaction mirror', it illustrates the relationship between employee and customer satisfaction. It shows from the external side, the SPC framework supports organisation's interest in service quality and connects to customer satisfaction (based on their perception), converted into profits, which is then mirrored from internal viewpoint linking it to productivity (Heskett *et al.,* 1994).

A study carried out by Silvestro and Cross (2000) where they reviewed the performance of the company and carried out correlation analysis. Their findings highlighted relationships between profits, customer satisfaction, productivity, service value, service quality (internal-external), customer loyalty, and output quality. However, the study excluded employee satisfaction evidences that could support this claim. In the literature a number of scholars argued that employee satisfaction does positively impact customer satisfaction (Tornow and Wiley, 1991; Roth and Jackson, 1995; and Helton, 2010).

Rucci *et al.* (1998) carried out a study that focused on the relationships 'between employee and financial performance'. They pointed out that the SPC's internal quality concepts are primarily concerned with the working practices, employee rewards and recognition and these factors drive employee satisfaction. However, they noted that the quality management or process improvement as internal operational process dimension is not well thought out in the SPC framework.

Through the review of literature, this author noted that the SPC focus and orientation is towards aspects of human relations and marketing, rather than operations. It is believed that the study of operational process dimension would help to enhance understanding to the SPC framework.

Another observation was made by this author, is that both practitioners and researchers have shown an interest into SPC as a management framework. It was also noted that SPC has been adopted, customised by organisations and rebranded such as the 'employee-customer-profit chain' by Sears. For example, Rucci *et al. (*1998) reported that Sears's executives used the SPC approach for cultural change, using cause-and-effect framework to track satisfaction elements and financial performance (Rucci *et al.,* 1998).

Similarly, Rust *et al.* (1995) devised 'Return on Quality' (ROQ) framework. This framework supports the idea that quality improvement efforts are investments and therefore should be quantifiable in financial terms. It allows companies to concentrate on the improvements initiatives that results in bottom line improvements for the business (Rust *et al.*, 1995).

The ROQ is a conceptual framework that supports improvement efforts emphasising the monetary benefits. In this instance the ROQ is a step ahead of the SPC as it supports cost, revenues and growth. However, this study considers since both of these frameworks places little emphasis on the improvement efforts or an approach. This point of view is in line with Rust *et al. (*2002, p.8). This is considered as a shortcoming because in most cases it is through the understanding of the approach of specific improvement initiatives or improvement projects that service quality improvement actually takes place. Hence, these existing frameworks may not

recognise if there are any issues connected to introducing or adopting a service quality improvement approaches as a business improvement strategy into an organisation. This provides an opportunity to extend this understanding further for Lean adoption as a business strategy into a service organisation with a view to improve service quality. In particular, the hypothesised relationships between employee, customer, and improvement results should be rigorously tested using empirical data. Therefore, the study proposes that further research should be considered in this area due to the lack of research done in this area.

It is necessary to review the literature in the area of performance measurement since this will form a background to understand how service quality improvements can be evaluated. It is hoped that the review of this literature will identify the important criteria that are required for measuring improvement results. These findings will be used in Chapter 6 for evaluating the airline company's results.

2.3.5 Performance measurement

Kaplan and Norton (1993) reported that organisations place a heavy emphasis on evaluating their performance using financial numbers. Brignall and Ballantine (1996) argued that organisations should consider competitive performance and quality as other performance criteria rather than focusing purely on financial measures. Kennerley and Neely (2002) identified the shortcomings of having just financial measures and argued that organisations should consider performance and quality measures by taking a balanced approach to include both financial and non-financial measures. Neely (1995, 2005) added that performance measures should be related to the organisation's strategic initiative.

Within the literature, Kaplan and Norton (1993) proposed the balanced score card (BSC) as the performance measurement framework which has been recognised as the most effective performance measurement framework. Literature lists several other measurement frameworks, for example; the performance measurement matrix proposed by Keegan *et al.* (1989), the performance prism discussed by Brignall and Ballantine (1996), and Neely (2002).

Neely (2002) commented that the BSC uses a balanced approach to measure both financial and non-financial performance. Kennerley and Neely (2002) and Kulatunga *et al.* (2011) agreed and added that the BSC framework has explicit links and these links are considered to be the most significant strength of the BSC. To use BSC, Kaplan and Norton (1993) suggested that organisations should first define time, quality, performance, and service related goals. They added that focusing on improvement activities, they should then translate these goals into operational measures. They recommended focusing on core business processes which impact highest on customer satisfaction.

Neely (2005) carried out a review of these performance measurement frameworks and identified two main shortcomings. Firstly, organisations collected an excessive amount of performance measures but could not interpret and analyse the performance data. Secondly, a narrow or uni-dimensional focus. These framework focuses mainly on quantifiable facets of cost and productivity, and lacks other criteria which are also important for competitiveness (Neely, 2005).

Brignall and Ballantine (1996) studied the performance measurement framework used in manufacturing and highlighted drawbacks in transferring these to the service sector. Their main concerns were the specific characteristics of services known as the IHIP characteristics (**I**ntangibility, **H**eterogeneity, **I**nseparability and **P**erishability) which are different from products.

This begs the question: how should a service organisation identify a set of measures that meets their strategic objective?

The next section contains a brief discussion on the other performance measurement frameworks that were found in the literature.

2.3.5.1 Discussions on other performance measurement frameworks

Brignall and Ballantine (1996), and Kennerley and Neely (2002) noted that the performance prism framework takes the stakeholder-centric view for performance

measurement and reflects the importance of satisfying stakeholder requirements and is also related to input-process-output value chain.

Neely *et al. (*2005) claimed that the performance prism framework that consists of two types of measure: 1) Lagging indicators that includes financial performance, and 2) Leading indicators that includes quality and resource utilisation. They said that the objective is to manage the relationships with stakeholders at the same time align and integrate strategy, process and people skills and capabilities together to deliver value.

Kulatunga *et al.* (2011) observed the performance prism which considers a wide group of stakeholders that includes employees, suppliers and regulators. It does not focus on just shareholders and customers. They argued that the performance prism communicates how measures defined in business related to stakeholder value and encourages a company to benchmark and monitor their performance against their competitors. Keegan *et al.* (1989) classified dimensions of measures that were related to internal, external, cost-based and non-cost-based and argued that these should be aligned with the organisation's strategy.

Another performance measurement framework developed by Brown (1996) that focuses on the cause and effect relationships. It includes the explicit links belonging to stages of business processes and their performance measures. The thinking here is that each stage of a business process leads to the performance of the next stage of a business process. This is similar to the ideas of leading and lagging indicators of performance prism framework (Brown, 1996).

The strength of this framework as noted by Neely *et al. (2002;* 2005) is the hierarchical view of business process and their measures. They added that it separates out the internal measures with external measures. Furthermore, they identified characteristics for developing a set of performance measures, which are as follows:

    1. The performance measures should provide a balanced view of the business. It should contain financial - non-financial, internal and external

performance measures and also include 'efficiency and effectiveness measures. Neely et al. (2002) defined effectiveness and efficiency as follows:

> *"Effectiveness refers to the magnitude to which customer requirements are met. On the other hand, efficiency measures looks at how economically firm's resources are utilised to achieve the level of customer satisfaction. This point is important since it identifies two fundamental dimensions of performance, as well as internal and external motives for the specific action"*
> (Neely et al., 1995, p.80).

2. The performance measures should cover all areas which are important for the organisation's success.

3. The performance measures should explain the cause and effects of the function's results, as explained by Brignall and Ballantine (1996), and Brown (1996).

4. The performance measures should be '*integrated across the business functions and level of hierarchy'*.

5. The performance measures should be comprehensible and includes all measures into one framework. It should pinpoint where a greater focus is required.

6. The performance measures should be easy to understand and its approach is simple to understand.

.

The above sections and subsections (2.2 to 2.3) provided definitions to the three subject areas, Lean, service quality, and performance measurement. This study discusses categorisation of reviewed literature in the following section.

2.4 Research hypothesis

In the above sections (2.2 and 2.3), the study has highlighted these subject topics (business improvement approaches with focus on Lean, service quality and

performance management) that are relevant to this dissertation. In doing so, the study discussed these viewpoints from the literature to show a particular standpoint, and covered the three subject areas. These three subject areas considered as a boundary for this research and it is represented in the mind-map diagram in the Figure 2.8. These three subject areas are represented as the central themes proceeding from the centre of the diagram and are divided into: 1a) business improvement methodology to cover as a background; 1b) Lean; 2) service quality; and lastly, 3) performance measurement. The mind-map is shown in Figure 2.8 below, where the main branches (thicker lines) represent the main focus point for the subjects and the small twigs within each branch represent the related subject areas. The most influential scholars' names have been listed to acknowledge their contributions to the subject in the adjacent table. The mind-map diagram (Figure 2.8) makes the research topic more visual. The 1a and 1b sections on the top of the diagram shows the origins and spread of Lean and yet the interlinked branches in 1a show influences of the different disciplines of business management philosophy and 1b show Lean application within diverse sectors.

Lean Manufacturing

Lean in different sectors

Lean integration with other approaches

Lean Definitions

Lean wastes

Lean Methodology

Lean History

Lean Implementations

Lean Services

Approaches comparisons

Lean Principles

Lean Origin

TPS

Evaluation criteria

Lean principles for sectors

PDCA

Lean implementation framework

Lean Successes

Lean Challenges

Lean Tools / techniques

1a) Business improvement methodologies

1b) Lean

Criticisms

Similarities/ Differences

Lean Benefits

Differences in Service Principles

Six Sigma

TQM

Criteria

System Thinking

Agile

BPR

Service classification

Lean failures

Lean implementation lesson

Lessons

Product Vs Services

Services CSF

Aviation Sector

Service Characteristics

Literature Review

SERVQUAL model

Service profit chain

Service quality improvements

Perf. Prism

EFQM

SERVQUAL dimensions

Service Quality measures

BSC

ROQ/SPC models

Grönroos service dimensions

Grönroos service quality model

Perf. characteristics

Perf. Measurement matrix

3) Performance Measurement

Service Value concept

2) Service Quality

Key contributors	Topics
Dean, Bowen, Deming, Hammer, Snee, Nave, Jammernegg, Povey, Zari, Antony, Hoerl, Tracey, Hensley, Dobie, Snee, Dahlgaard, Putnik, Grima,Hackman, Chakraborty	TPS, TQM, BPR, SIX-Sigma, & Agile
Hines, Womack , Jones, Roos, Taylor, Johnston , Greenwood, Levitt, Motwani, Allway, Swank, Reinardt, Bicheno, Emiliani, Carlborg, Seddon, Snee, Dahlgaard	Lean, Lean Services
Zeithaml, Berry , Verma, Robinson, Flynn, Rust, Heskett, Grönroos, Parasuraman, Baker, Lamb, Lassar, Neely, Kaplan, Norton, Keegan, Brown, Harris	Service Quality+ Performance Measurement

Figure 2.8: Literature Review mind map

The mind map presented as a taxonomy (see Figure 2.8) of the published literature on business improvement approaches display that each branch and sub branches within the diagram highlights the fact that there has always been a growing need to adopt a business improvement approach to remain competitive. It also portrays the

business improvement approaches evolution as a philosophy and that has led to a requirement or a norm to evaluate their impact on business growth and its sustainability.

The spread of branches with twigs show the manner through which business improvement theories have evolved and penetrated into other business sectors. A number of reviewed articles discussed the evolution of business improvement methodologies that included TQM, BPR, Lean and Six Sigma. This helped to recognise similarities and differences, and ascertain strengths and limitations of each methodology. These are summarised and recorded in Table A-1 'Comparison of Methodologies', which can be found in Appendix A.

The reason Lean is depicted as a separate branch is to show that Lean was first used in the manufacturing sector that acted as a role model for service sector. The shift occurred at a later stage from the production of services towards the industrialisation of services (McDonalds as a case study example). It was noted that several success factors for Lean implementation in services highlighted the importance of service quality, customer value and service culture. These are labelled as 'soft issues' and are different from Lean manufacturing. There are many publications with example case studies which highlighted the fact that Lean has been applied successfully in Health and Banking services.

However, for airline services, very few in-depth academic studies could be found in the Lean subject area. Although some case studies of Lean application were available which demonstrated the successful application of some of the Lean tools and techniques and as a result created a little islands of improvements. A very few airlines (United Airlines and Japan Airlines) who experimented with Lean improved their customer satisfaction and lead times (Brignall and Ballantine 1996) and Brown 1996). Closer to home, a handful of European airlines, such as Lufthansa, and British Airways, used the Lean approach in their engineering department and back offices operations. Within the literature, very few articles had evidently recorded that Lean application in these airlines had positive impacts on productivity, cost savings, operational efficiencies. However, overall, the biggest challenge noted for this sector

is to make all of the actors' i.e. frontline staff, managers, operational staff, and administrators aware of Lean practice and demonstrate benefits. Due to their multinational occupancy formalising Lean method to suit their service context proved difficult. Therefore, to obtain an in-depth understanding of Lean adoption within the airline sector, an empirical case study is deemed important. The study believes that this will extend the theoretical and practical knowledge.

Reviewing and analysing the literature has highlighted that a new paradigm called 'service quality' a terminology surfaced to form a customer-centric view on services to fulfil customers' needs. This has been the essential requirement for the service quality as it has a significant impact on satisfaction.

Within the service literature, a number of scholars have noted similarities between the increasing cost and declining quality in services as previously observed in the manufacturing (Quinn and Gagnon, 1986 and Zeithaml *et al.*, 1990). In response, Womack and Jones (1996) anticipated and stressed that Lean can play a major role in the service sector and this claim has been echoed by a number of researchers and practitioners (Abdi et al., 2006, Atkinson, 2004, Corbett, 2007, May, 2005; and Ehrlich, 2006). Despite this interest, there appears to be little literature whereby a full study of the actual deployment of Lean in a single institution has been recorded. It also confirmed that there exist some ambiguity within the management community for adopting Lean concept for service quality improvements.

The published literature relating to Lean shows that service sectors are adopting Lean to cut costs and improve service quality. A few published examples tend to focus on an explanation of Lean theory or advocate its use, with relatively little effort given to analysis of the outcome of Lean implementation. This supports the claim made by Womack and Jones (2003) that '*Services is lagging behind the other matured sectors such as Manufacturing when it comes to adopting Lean'*.

Reinardt (2007) claims that service quality improvements are significant in airlines, since these company are vulnerable to price competition. He points out that in order

for a company to remain competitive the concept for improving service quality could be used as domineering business strategy.

Review of literature identified the SPC and ROQ as two most popular service quality improvement frameworks that are 'marketing-originated' frameworks but are being used in the operational context. It has becoming an increasingly important to evaluate the outcome of the Lean initiative so that the momentum of change can be maintained, improvements can be embedded into the organisation's, systems and structures are created that ultimately helps to create a culture for continuous improvement.

There are some evidences in literature where financial measures have been used for appraising organisational performance and for that some scholars stated that it is inappropriate to focus purely on financial measures (Kennerley and Neely, (2002), Kaplan and Norton (1993) and Brignall and Ballantine (1996) also observed that organisations had placed heavy emphasis on financial measures, ignoring other performance criteria that could be used to measure their competitive performance.

Kennerley and Neely (2002) have observed the shortcomings of financial measures and noted the change in some organisations whereby a balanced approach in defining their performance measures (financial and non-financial measures) is being considered. Within a literature a number of performances measurement frameworks have been reported that enables organisation to define a multi-dimensional set of measures (Keegan *et al.*, 1989, Kaplan and Norton, 1993, Brignall and Ballantine, 1996, and Neely *et al.*, 2005). However, Neely (2005) identified two main shortcomings as discussed in the previous section. In support of this view, Wu & Liao (2014), and Kulatunga *et al* (2011) added that these shortcomings can cause a negative impact (investment cost, time) and create confusion. This begs the question: how to define an appropriate set of measures for an organisation that supports them to accomplish their strategic objectives for improvements?

This author believes that this area has been under studied and requires greater understanding. This dissertation therefore attempts to address the aspects of how Lean as a business improvement strategy is used within the airline company through identifying the fundamental nature of Lean and the relationship between Lean initiatives and service quality results. These results can then be evaluated by Lean leaders or practitioners for selecting a subsequent rounds of improvement initiatives.

This research taxonomy has identified and classified themes to meet with research aim. It establishes the scope of each topic and the dependent points in all three subject branches.

2.5 Summary

This chapter critically reviewed and catalogued the existing literature which is related to the research aim and objectives included in chapter one. For this research, the primary objective is to explore Lean's adoption as a business improvement strategy, which is becoming increasingly prevalent within service companies. This review highlighted the fact that Lean application as a business strategy appears understudied in airline services and hence there is a need for conducting empirical research. Moreover, the review identified that current practice of Lean seems to be tools and techniques based and omits the 'soft aspects' of Lean. The soft aspects appears to be a significant factor in Lean adoption within service sector. This suggests a need to explore the concept in greater detail to assist academics and practitioners to understand in a greater depth.

In section 2.1, an approach taken for the literature review that explored the literature in the domain of business improvement methodologies, service definition and performance measurement as three key subject areas were shared.

Next the service quality topic was explored. Two influential service quality frameworks ('PZB' and 'Grönroos') were discussed and key points were compared contrasted and concluded that TSQ and FSQ are central to this research, and

required further exploration. In doing so SPC and ROQ service quality frameworks were explored to broaden the understanding of service quality literature in much detail.

Following from that the performance measurement literature was considered to identify a balanced set of measures that are used in services. The various performance measurement frameworks were considered and identified links between cost, deliver and quality domain.

The mind-mapping technique was applied to structure the research topics and assimilate pertinent information that had been gathered. This mind map is depicted in section 2.4.

The literature review identified clear gaps in the field, which were summarised in section 2.5. The next chapter discusses the author's conceptual framework derived from the literature review and proposes sets of research threads that will then become the main focus of this research.

CHAPTER 3 : LEAN APPLICATION IN THE CASE STUDY COMPANY

The previous chapter discussed the context of the thesis while the focus of this chapter is on developing lines of inquiry to provide a base for this research. The reviewed literature from chapter two highlighted factors that influence Lean application for service quality improvements and therefore this chapter builds on that by generating a number of propositions. As such, a detailed interpretation of both the Lean initiative and the outcome of Lean improvements is given, in order to show the interrelationship between both within airline operations. Through examining Lean initiatives, exploring service quality attributes and performance measurement frameworks, a conceptual framework for Lean adoption for the airline company in this study is then proposed.

From the literature review carried out in chapter two, it can be argued that Lean is implemented in various sectors in numerous ways (e.g. Health Services, Government offices and Educational Institutes) to reduce cost and improve quality of the business operations. Lean adoption in many of these sectors has highlighted that the Lean approach constitutes some of the basic principles, tools and techniques of previous quality management approaches, and shows that it is evidently well suited for product-service based industries.

Chapter two included Lean thinking and the Lean approach which is typically found within services for service quality improvements. Review of service literature highlighted that Lean implementation is ambiguous and requires further explanation on how Lean initiative influence improvements in service quality. Furthermore, the dissertation shows how Lean strategy is represented in services. To follow on this chapter addresses two issues: firstly how Lean is being applied in the airline company, and secondly, lists factors that influences the service quality improvements within the airline company? To conclude this chapter, a conceptual framework for an airline company is developed.

3.1 Case study company background

The case study company considered here is UK based the second largest airline organisation in the world, based on the fleet size, international flights and route network. Since its inception, the company entered a period of rapid and unprecedented growth and dominated its domestic rivals during the early 1990s. Faced with increased competition and higher costs in the mid-1990s, the CEO led a restructuring effort, leading to trade union clashes. In the early 2000s, the next CEO implemented further cost cuts and moved its primary hub to the new airport, and again experienced threats of industrial action, leading to a strike. The company then explored other avenues such as merger and acquisition activity with smaller airlines, and as a result has become the world's third-largest carrier (after Delta Airlines and American Airlines) in terms of annual revenue.

For any given airline, a main business goal is to transport passengers or goods (cargo) from location A to location B. In the airline business, the business processes, procedures and supporting systems are put in place to provide safety, profitability and customer satisfaction. Appendix D 1.2 includes a diagram that depicts an end-to-end value creation map for the case study company together with some other brief information on departments and its functions. For example, checking in for a flight, arriving at the gate, flying to the final destination and dealing with any post-sales queries, if any, such as complaints and lost baggage are considered to be core processes and are supported by the organisation's business departments, for example purchasing, human resources and technology. These departments carry out appropriate activities to support the core process. For example, the purchase product department will purchase fuel, catering supplies. These departmental activities are dependent on external companies' processes; for example, meal services served in the air are supplied by external companies; they also in-turn, are dependent on logistical company services.

 Although the passenger wishes to be transported around the world, in order to make this experience enjoyable, a lot of work has to be carried out behind the

scenes by many internal departments and external companies, these different moving parts must be orchestrated. The passenger, is although essential to the service, can perceive these facilitating services as a hygienic factor, that is, they doesn't provide additional value to the customer experience. But, if for some reason these services fail, it can be a big dissatisfaction factor; for example, offering meal services for vegetarians or kosher meals. In addition to this, the activities within these processes are time-consuming and time-bound; if not executed correctly, they can take away value from the flying experience.

In 2005, the case study company embraced Lean to improve its operations, service quality, and culture and customer satisfaction. The company formed an association with an external consultancy to steer this initiative and undertook Lean training. As a measure of commitment, the case study company sent twenty-one managers for training to become 'Lean coaches'. The Lean coaches were then unitised as a team and branded themselves as the 'Lean Continuous Improvement (Lean CI) Team'. The senior leadership team mandated the Lean CI team to lead the Lean transition across the case study company. To spread Lean fast, the Lean CI team management took an approach to loan the team members into specific business areas to initiate and execute business improvement projects.

Historically, the case study company experimented with many other business improvement approaches and deployed a variety of methodologies such as TQM, BPR, Six Sigma and Agile (in its information technology (IT) business area). The Agile methodology is still in use side-by-side with Lean due to the fact that the company's IT department has outsourced many of its IT developmental activities to third-party IT suppliers. The third-party IT suppliers have adopted the Agile approach into their own organisation and therefore the Agile methodology has become a standard for the company's IT solutions, design and delivery. Since the case study company's IT team are only involved in the beginning at the design stage and at the final stage of the service delivery, they have agreed to adopt Agile. In addition, Six Sigma was introduced to the case study company's engineering department and is still being practiced by a number of green and black belt Six Sigma practitioners.

Over the past eight years, Lean has been experimented and these initiatives are labelled as 'focused improvement' initiatives. The Lean coaches also support additional activities in order to raise awareness of Lean within the case study company. For example:

- They deliver Lean overviews to colleagues across the geographical boundaries of the organisation

- They run a Lean awareness and Lean business change training

- They hold quarterly Lean forums to provide networking opportunities and celebrate successes

Observing the success of these initiatives, the leadership team has added 'Lean Continuous Improvement' approach into the company's business plan and added as the business improvement strategy for service quality improvements and to support cultural change. The Lean Continuous Improvement as a business strategy announcement has been cascaded through multiple management briefings, newsletters and the company's intranet site. The company's internal magazine contains regular articles on Lean improvements across the company and participants in initiatives share their experiences. To further support and acknowledge the challenges faced by the departments who have experimented with Lean, the leadership team has acknowledged that implementing Lean is a daunting task. They agree that achieving success with Lean will be a long and slow journey. They commented that the fundamental change in learning Lean and adopting it into the company's culture requires the desire of the organisation's members to be engaged and make a commitment with total conviction to continually improve the company's service offering. These viewpoints are aligned with the views expressed by Lean literature scholars such as Womack, Jones, Roos, and Spear (1999).

The intention to deploy Lean in the company's operations appears real since extensive plans and a Lean strategy have been initiated and major projects are being pursued (Senior Manager of Lean CI Team). However, it is not clear how far this strategy has been deployed, nor how thoroughly or effectively the Lean principles are actually being used to improve the service quality.

3.2 Development of a central theory

As pointed out in the above sections that Lean as a business improvement strategy alone is not enough. The dynamic relationship between internal and external service quality elements implies that this is paramount important to the initiation, execution and evaluation of Lean results. Understanding the process by which Lean initiatives lead to their results is critical. This supposition agrees with Grönroos' service quality model that states that without relating to a company's service quality dimensions to the Lean outcome, the evaluation is meaningless.

To satisfy the research aim stated in chapter one (section 1.4), it requires a conceptual theory that allows the research questions to be raised and it is covered in the following section.

3.2.1 A framework for Lean service quality improvements

In order to conceptualise an inter-relationship between Lean initiatives and service quality improvement results, the key drivers for Lean application have been identified. This means exploring Lean, service quality elements and its results into a structured, interpretive and evaluative manner that covers critical success factors (CSFs). This is in line with the context of Grönroos' service quality model (1988) as outlined in chapter 2 section 2.3.3.1 earlier, and the associated performance measurement concepts as also discussed by Keegan *et al.* (1989), and Kaplan and Norton (1993), in section 2.3.5.

The literature review coupled with the author's experience suggests that Lean and performance measurement alone does not capture all of the aspects of service quality improvement. From the review of literature, an observation has been made that points out that Lean approach in services to date focused more on tools & techniques rather than processes and process executers.

In light of the literature discussed in both chapters 2 and 3, this conceptual framework is constructed as shown in Figure 3.1. This is related to Grönroos' service

quality model because these concepts have been expressed as delivery, quality, cost and outcome (results).
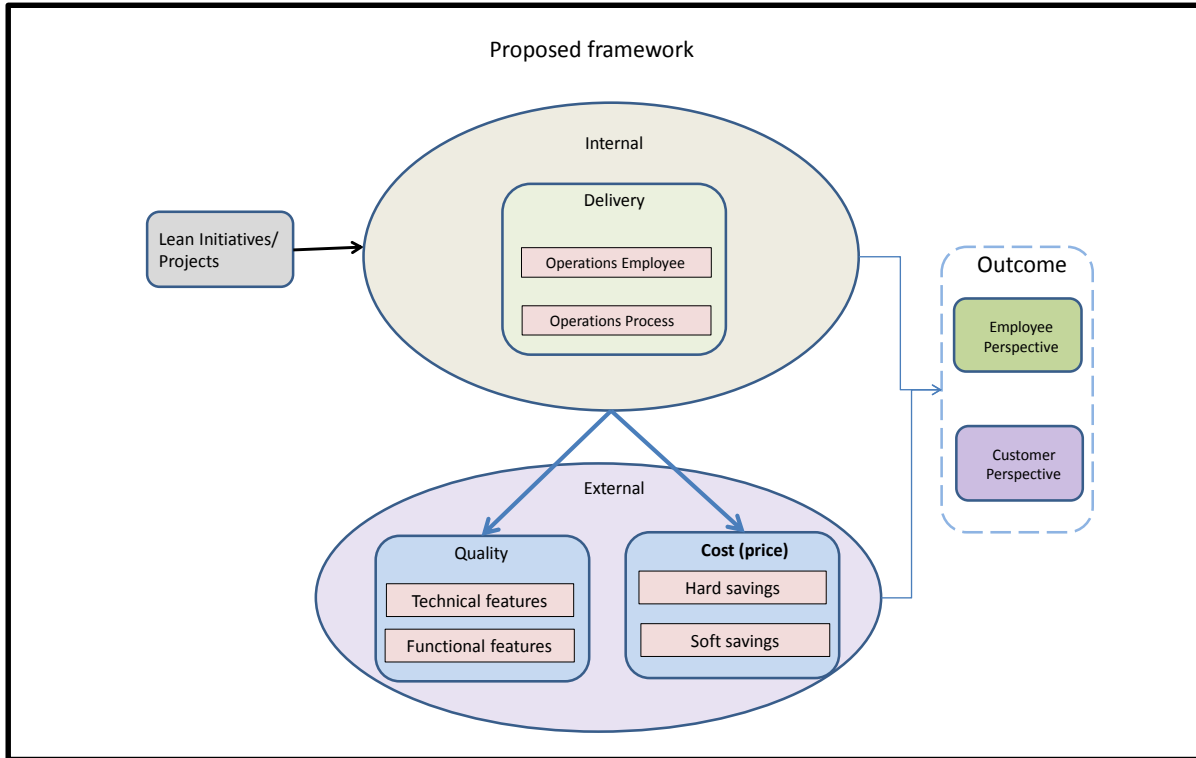
Figure 3.1: Lean service quality improvement conceptual framework (derived from the literature)

The Lean service quality improvement framework shown in Figure 3.1 includes the soft elements of the service quality and considers human side of change. Figure 3.1 depicts the contributing factors to service quality dimensions that are essentially drivers for the Lean initiative and its results. These results can be evaluated using satisfaction as a type of measure. The current service quality literature does not clarify if these drivers are significant or do they follow in any order of importance.

The above figure 3.1 includes more subtle factors (social, psychological) that have been highlighted in the service quality literature and can be considered for Lean to understand its adoption covering all stages from initiation to implementation.

However, Widzer (2001) argued that the Lean outcome of equally importance as to how Lean is applied in the organisation. Supporting with this view point, Becker *et al.* (2011) commented that comparing performances of service organisations without

taking customer and employee satisfaction into account would be a trivial pursuit. They stated that in a service industry, '*the (perceived) service quality has to be accounted for, since it is closely intertwined and often conflicts with economic resource utilisation*' *(Becker et al., 2011, p. 2).*

An attempt is made to contextualise the Lean approach within an organisation, considering the two aspects of Grönroos' service quality model. These factors are related to each other as this is part of the service quality dimensions recommended by many researchers and practitioners. Therefore, a relationship between these aspects and the underlying factors that may have impact on employee and their processes (the top two boxes of Figure 3.1) are considered. In other words, human and process dimensions are required to be understood to represent Lean. To evaluate improvements, satisfaction (employee and customer perspectives) should be considered as an output. The inter-dependencies between these factors depicted in this framework requires further understanding. These have been only briefly noted within the literature but not discussed in extent.

3.3 Summary

This chapter highlighted specific contextual 'threads' related to literature on Lean and service quality. The chapter began by describing the current Lean thinking in services and Lean approach that is relevant to airline services, which is the focus of this dissertation. The introduction of Lean within an airline service was then presented to provide background to the central theory.

Following on from this, the discussions then led to uncovering many different concepts, views and thoughts that exist with Lean deployment but concluded that these may or may not be manifest in airline services.

Through discussing the concept of service quality dimensions as defined by Grönroos' model, it was discovered that the aspects of the operations employee and operations process have not been fully explored within the literature. Moreover, the review of the literature pointed out that defining these factors are inherently difficulty

and complex for services. Thus, there is an opportunity to explore these angels into this study.

The researchers within this field acknowledged the fact that this subject area has been under researched and limited analysis has been undertaken that systematically shown how different variables relate to each other for services. This is despite the fact that it has been recognised that Lean is a stakeholder management system (not a management system for a handful of stakeholders!). It is heavily dependent upon evaluating its results to assess its impact on all stakeholders within the organisation. It was also highlighted that delivery, quality and cost relationships are not mutually exclusive. Instead, the underlying notions of service quality dimensions were introduced to address the hard-soft elements of improvements. Following this, the study outlined a structured, interpretive and evaluative framework, taking into account of CSFs in relation to Lean and service quality improvements.

The novel view presented through the proposed framework contains delivery-quality-cost-result (satisfaction) and harness Lean approach into service organisation. The framework contains soft and hard elements of service quality. Based upon the concepts defined above, a case-specific social dimension thread was presented to highlight the fact that a relationship between service qualities dimensions may exist. The review of literature highlighted that some scholars investigated Lean adoption within services and concluded that the internal quality includes aspects of operations employee and operations process, which is associated with certain aspects of project delivery. This led to another assumption-based thread - internal quality is linked with the cost savings (current & potential savings). These factors were included in the conceptual framework highlighting the importance of factors for service quality improvements. The framework is created to suit the analysis for exploring Lean deployment within the airline company.

CHAPTER 4 : RESEARCH METHODOLOGY

The previous chapter concentrated on creating a context for a central theory, this chapter includes a research methodology for exploring Lean deployment within an airline company. In doing so, research design is designed that includes the core components from background theory and presented in the research strategy. An empirical case study methodology is considered to meet the purposes of this research and is complemented by semi-structured interviews and survey questionnaires. These two supporting activities will seize complete details of each case. A diagram is constructed to represent key steps to the research approachand will be used to formulate research questions.

This chapter also highlights the significance of selecting an appropriate research methodology and supports with the contextualising of the arguments that are required to have a multidisciplinary approach. This underpins the view that Lean application is in evaluative in nature and is based upon socio-psychological facets. The chapter includes data collection and analysis methods and highlights the approach for the empirical case study research with supporting methodology.

4.1 Research process

For this research study a flow chart was constructed (see Figure 4.1), which describes the key stages and the overall research design. These are similar to those outlined by Nieto and Perez (2000) containing background, central theory and data as reference and underpins linear approach for research process as described by Woodside and Wilson (2003).
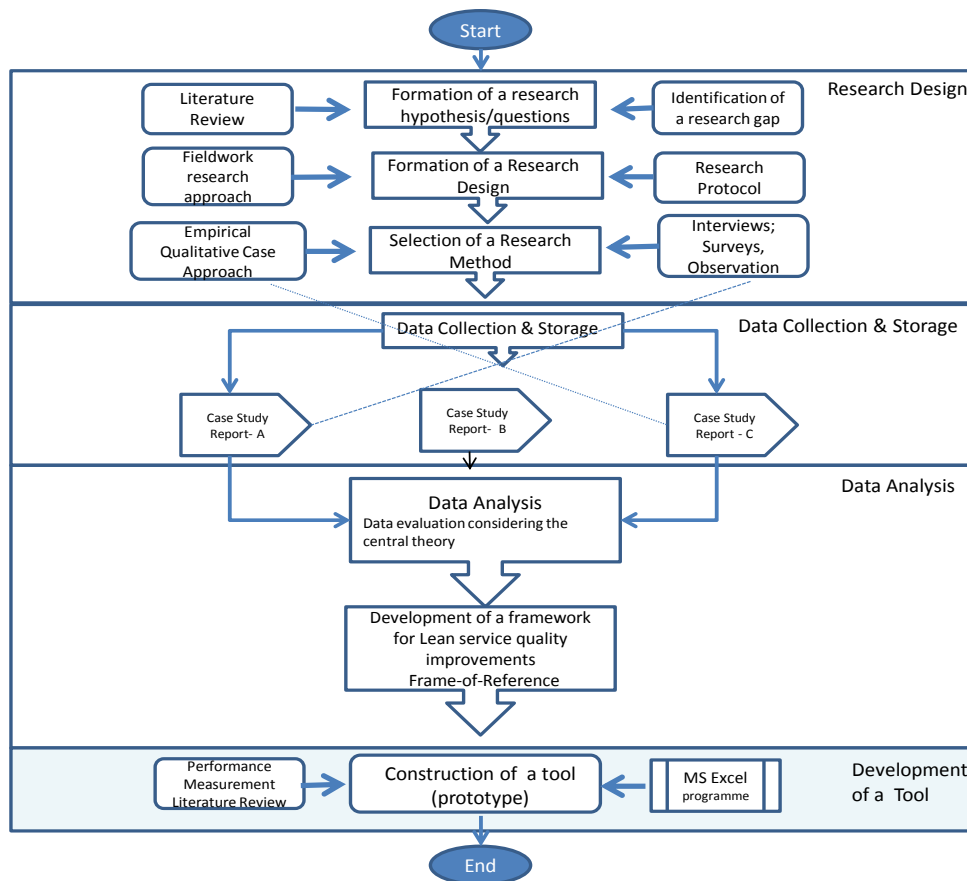
Figure 4.1: Research methodology flowchart

The diagram, shown in Figure 4.1, is a flowchart composed in 4 sections that includes the research design, data collection & storage, data analysis and finally the development of a prototype tool. For this dissertation, the philosophical argument has been defined in the previous chapter and is shown as a first stage in the above diagram 4.1 which focuses on a research strategy and methodology. Following on chapters 5 and 6 will include the data collection and analysis.

The Figure 4.1 shows, the research process as interconnected and sequential tasks that will be used for this research. Yin (2014) claims that the research design should be a logical plan and should show how the research will be carried out. He added that it should include why a research question requires an answer, and what conclusions can be drawn from that. He stressed that before data is collected against the research threads, an appropriate research methodology should be constructed (Yin, 2014). This is covered as follows.

4.2 Research methodology

As previously discussed, Lean methodology has borrowed concepts from many quality management disciplines and evolved. Review of literature has confirmed that Lean was originated in manufacturing but has been adopted in various other sectors. Therefore a suitable approach is needed to collect data and analyse in order to justify how Lean has been implemented within the airline company. Easterby-Smith *et al.* (2002) argued that methodologies are key to our human sense of reason, it adds to our conscious thinking, and allows us to question the rationality of action. They recommended to have a multidisciplinary research methodology to reflect the different aspects of an organisation (Easterby-Smith *et al.*, 2002). Thus, for this research a decision is made to use both quantitative as well as qualitative epistemological positions. The next section defines research philosophy in further details.

4.2.1 Research philosophy

Easterby-Smith *et al.* (2002), and Jogulu and Pansiri (2011) proclaimed that if a researcher is aware of philosophical issues, an appropriate research design can be selected that meets the research objectives. Easterby-Smith *et al.* (2002) and Lundberg (2003) argued the importance of making certain philosophical assumptions prior to the start of the research. This section therefore considers a broader view of research philosophies in order to determine the research design that would meet the research objectives outlined in chapter one.

The review of methodology literature highlighted that positivism (objectivism) and social constructionism (subjectivism) are the two philosophical traditions used in academic research. Easterby-Smith *et al.* (2002) and Cameron and Molina-Azorin (2011) described the difference between these two paradigms as ontological assumption and epistemological assumption. The literature defines ontological assumption as '*how reality has been viewed by researchers, and epistemological assumption is what has been perceived to be the best ways of making an enquiry into the nature of the world*'. On the other hand, positivism believes in an idea that is that the world exists externally, and therefore its properties should be measured by

quantifiable numbers rather subjective comments. Subjective objectives are measured through sensation, reflection and intuition. (Easterby-Smith *et al.,* 2002; Lundberg, 2003 and Molina-Azorin, 2011).

People make sense of the world through sharing their experiences with others, and that is a focus for social constructionism (Easterby-Smith *et al.*, 2002, p.28). To build on this viewpoint, Lundberg (2003) stated that knowledge that is developed through the positivist lens is based on independent observation and the measurement of reality. Easterby-Smith *et al.* (2002) ,Hussey *et al.* (1997), Easterby-Smith *et al.* (2002), and, at a later date, Cunliffe (2007), commented that for social constructionism, qualitative approach is preferred. They recognised that the researcher is involved with whatever is being studied (Hussey *et al.*, 1997, Easterby-Smith *et al,* 2002, Lundberg, 2003 and Cunliffe, 2007**)**. Table 4.1 summarises these differences in the structures of positivism and social constructionism paradigms.

Table 4.1**:** Positivism and Social constructionism paradigms comparisons

	Positivism paradigm	**Social constructionism paradigm**
Assumptions		
Ontological (nature of reality)	Objective reality and external (apart from the researcher)	Subjective reality and being determined by people
Epistemological (How to know it)	Independent researcher - separate from that being researched	Researcher is involved and interacts with that being researched
Methodological	☐ Deductive process ☐ Static design – categories identified before study ☐ Generalisation - prediction, explanation, and understandings	☐ Inductive process ☐ Emerging design ☐ Patterns, theories developed for understanding
Implications		
The observer	An independent	Interdependent
Human interests	Irrelevant to human interest	Relevant
Explanations	Casual	Gathers understanding of the situation
Research process through	Hypotheses and deductions	Rich in data - ideas are encouraged
Concepts	Operational and measured	Includes stakeholders points of view
Unit of analysis	Simple terms	Complex
Sample requires	Large volume- random selection	Small volume – specific selection
Generalisation through	Statistical probability	Theoretical abstraction
Preferred research methods	Quantitative research methods	Qualitative research methods
Characteristics		
Aims	To discover	To invent
Entry	Theories	Meanings /values/consequences
Techniques	Measure	Converse
Analysis	Verification	Sense-making
Results	Links /connection	Explanation
Strengths and weaknesses		
Strengths	☐ Provide wide coverage of the range of situations ☐ Fast and economical ☐ May be of considerable relevance to policy decisions	☐ To understand people's meanings ☐ To contribute to the evolution of the new theories ☐ To adjust to new issues and ideas as they emerge ☐ Identify how change processes over time
Weaknesses	☐ Tend to be inflexible and artificial ☐ Not very effective in accepting processes for which people attach actions ☐ Not very helpful in generating theories	☐ Time and resources consuming ☐ Analysis and interpretation are difficult ☐ Difficult to control research process (e.g. progress, endpoints)

Source: Hussey *et al,* (1997), Easterby-Smith *et al,* (2002), Lundberg, (2003), and Cunliffe, (2007)

Easterby-Smith *et al.* (2002) noted that his study adopts methods from the particular epistemology position. They added that the key point is that based on the author's epistemological assumption, the research design and research methods selected which suits to the study.

The objective of this research is to explore how an airline company conducts Lean projects in order to improve their service quality and gain an understanding of Lean adoption in airline services. In collecting data for analysis and interpreting the contents of data, the researcher is somehow involved. For this study, the 'social constructionism paradigm' is deemed more appropriate to consider, that is characterised in Table 4.1. It will help to explain the scholars' reflection of the real world. Referring to the research philosophies matrix developed by Easterby-Smith *et al.* (2002) the following Figure 4.2 presents the author's philosophical assumptions.
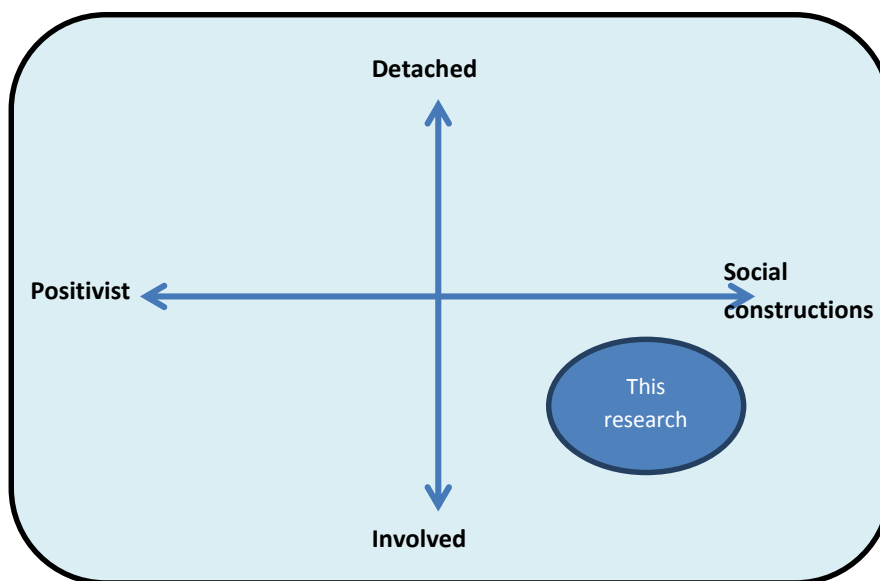
Figure 4.2: Positioning the author's philosophical assumption

Source: Easterby-Smith *et al. (*2002*)*

The philosophical assumptions map (see figure 4.2) underpins this research to construct the research strategy applicable to this study. The data collection and analysis methods will be considered in detail in subsequent sections but before that the following section describes the research design.

4.2.2 Research design

According to Lundberg, (2003) for implementing the methodology, research design is necessary and important too. For this study this was identified in Chapter 1 (Figure 1.1).

To start a review of the literature provided a list of research questions that needed to be explored. This view is in line with Yin (2014), who argues that review of literature should develop an insight and propose questions that have been identified in the published literature and set the context for the research. He further added that if The research question(s) are clearly stated, it helps to create an appropriate (set) of presumptions. For this research, this has been developed in chapters 2 and 3 respectively.

Yin, (2014) advised that a suitable strategy for data collection should be defined. He added that the strategy should include the research type and also the governing practices (i.e. the protocol) for recording data. Lundberg, (2003) added that these support data collection so that it can be analysed during the research design phase. Analysis finally leads to conclusions that is based on empirical evidences and that supports or rejects the research hypothesis. This is discussed in detail in the following sections.

4.2.2.1 Case study approach

Nieto and Perez, (2000) claim that this approach provides an understanding of the dynamics present within single settings. McCutcheon and Meredith,(1993), and, at a later date Rao *et al.* (1999) stated that the case study approach is mostly used in operation management (OM) research. A number of scholars have observed that the case study is deemed to be the most powerful research strategy, in particular for developing new theories (McCutcheon and Meredith, 1993, Meredith, 1998, Voss *et al,* 2002). Meredith, (1998), and Voss *et al.* (2002) added that this approach clarifies 'how' and 'why' questions and helps researchers to expose the real problems and bridges the gap between management theories and practice. Woodside and Wilson,

(2003) supported this view and elaborated that case studies enhance understanding by deriving the meaning behind assumptions and beliefs.

A couple of examples that use case study as a research approach have been noted within the literature. Bali *et al,* (1999) qualified a conceptual model developed for implementing management information system in an engineering company in the UK. Here, a number of case studies were collected from the participant organisation and these were used to analyse and assess the culture of the organisation for adopting the system.

Another good example of the use of case study as a research approach form a study carried out by Buavaraporn, (2013). This study explored service quality principles in financial institutions in Thailand who adopted various business process improvement methodologies to improve their service quality. They investigated three major banks and used an empirical case study approach where data was gathered via survey, documents and interviews and data analysis was highly qualitative that included narrative analysis.

Eisenhardt and Graebner, (2007) claimed that building a theory from case studies should use more cases to create theoretical concepts, propositions, and/or mid-range theory based on empirical findings. They argued that multiple cases makes a stronger base for theory building and develops a more intricate and robust theory. They added that the case study approach helps researchers to identify patterns easily.

As mentioned previously in chapter one and reiterated in chapter two there is a lack of empirical research for Lean adoption in airline services with a focus for improving service quality. In order to add perspectives of Lean adoption in airlines into the scholarly literature, it has been believed that 'case study' is a well-suited research strategy for this study. Moreover, given the strengths mentioned above for using multiple cases for case study research, it is deemed appropriate to use multiple cases taken from the single case study organisation for this study. The author

believes that this will enable to identify similarities and differences of Lean adoption within a single airline organisation that is considered critical to the emerging theory. The next session discusses the rationale behind selecting cases.

4.2.2.2 Case study selection

Nieto and Perez, (2000) and Woodside and Wilson, (2003) argued that in order to build theory from case studies, selecting cases is a crucial part for theoretical replication. Since the aim of this study is to explore Lean adoption in the airline company, **nine** cases have been selected from a single case study organisation. A preliminary investigation was conducted into the departments who experimented with Lean. The four criteria for case selection were used such as 1) purpose of research; 2) experience in Lean adoption (number of Lean projects started and completed); 3) availability of data; and 4) accessibility. As Lean is a relatively new business improvement strategy for the case study company, plausible cases to carry out study were limited. Four departments who completed a number of Lean projects were shortlisted for preliminary interviews and decision were then made to obtain cases from three departments. It is believed that this was a good mix of cases which covered internal and external perspectives.

4.2.2.3 Data collection

Eisenhardt and Graebner, (2007) argued that building theory from case studies requires rich empirical evidences that can consist of qualitative and/or quantitative data.

Orosz, Miles and Huberman, (1997) and at a later date by Cunliffe, (2007) argued that qualitative methods enables researchers to gain detailed understanding and provides explanations of the incident under study. Nieto and Perez, (2000) noted that there are numerous methods for collecting empirical data such as interviews, documentation, survey-questionnaires, and observations.

For building a theory Jick, (1979) and later on Nieto and Perez, (2000) both suggested that multiple data collection methods should be employed to strengthen

the base for the theory. Voss *et al,* (2002) mentioned that using multiple data collection methods and sources improves reliability and validity. Easterby-Smith *et al, (*2002) pointed out that interview as a data collection method helps to gather valid and relevant data in a timely manner.

Yin, (2014) suggested that planning for data collection is important in the case study approach. He added that for data collection, major tasks include, to gain access to the organisation and to devise a clear schedule for the data collection activities. Woodside and Wilson, (2003) suggested that a protocol should be developed to increase reliability. For this study, interview was selected as the main data collection approach supported by survey questionnaire for qualitative data collection.

The following sub sections briefly discusses details on the various methods and techniques which were considered for this study.

Interview

Easterby-Smith *et al,* (2002) and Voss *et al,* (2002) argued that interview enables to gather empirical data and to gain insights into the topic quickly. They explained that if the aim of the research is to build a theory, interview as a data collection approach allows flexibility and maintain the focus. Cameron and Molina-Azorin, (2011) recommends using a pre-defined list of questions for managing a sequence of interviews effectively. This is often referred to as an 'interview guide' (Cameron and Molina-Azorin, 2011).

However, Yin, (2014) pointed out that an 'interview bias' could occur using this approach for collecting empirical data. In order to mitigate such bias, Eisenhardt and Graebner, (2007) suggested to use a number of knowledgeable informants who can provide diverse perspectives.

Considering the above suggestions, a protocol was developed that consisted of two main sections a protocol checklist along with an interview log and semi-structured interview questions (see Appendix B 1.1). These were designed essentially for collecting data from the departments consistently. The research protocol served as a guide for conducting the interviews, and a checklist ensured that all topics/processes were covered prior to and during the research process.

Following on, a plan was created and interviews were carried out with selected employees. During the research, a number of Lean consultants were approached who were on contract to work on some Lean-Six Sigma projects within engineering department and attended a quarterly 'Lean Forum' event organised by the Lean CI team. This was an opportunity too good to be missed in order to obtain information on the Lean deployment in a broader context. The anecdotal opinions was discarded from these sources as research evidences. However, these discussions did help to add more probing interview questions to the interview questions list.

The selective of informants for the interviews were from different levels of organisation that includes senior leadership roles, middle management who were jointly responsible for promoting Lean as a business improvement strategy within the organisation. The selection was then then extended to other levels. Semi-structured interview questions (see Appendix B 1.3) were created, and reviewed by at least three academics/consultants and two practitioners. Their feedback was gathered and incorporated into the question bank. The key questions were shared with the interviewees in advance of the interview. The interviews lasted around 45 minutes to 90 minutes per session. It was agreed that the conversation will not be digitally recorded, hence, extensive note-taking of key points with rechecking it with interviewees helped to ensure that information was captured accurately.

Survey-Questionnaires

A questionnaire (see Appendices B 1.7 – B 1.8) was prepared and used for collecting quantitative data to verify gathered information from interview and historic records. In some cases access was restricted, therefore the survey-questionnaire provided additional quantifiable data. The questionnaires contained six open-close ended questions and were administered through surveys and was also added as an agenda item on a team away-day event. These qualitative data results were supplementary to the data gathered through other means interviews.

Observation

The review of literature highlighted that observation technique can be used as a supportive method for data collection. This is also supported by Lean as it promotes 'Go-Look-See' principle to observe and understand the problem or issue. Participant observation was used for a limited period only to record and detail taken for the Lean improvements and one of their process improvement workshop. This approach allowed to find out how a project was executed, and allowed an access to collect qualitative data which would be otherwise difficult to gather. This also provided some example scenarios that were used to encourage participants to clarify some of their opinions and enhanced author's understanding.

Observation method can be biased as claimed by Quinn-Patton, (1986) and Woodside and Wilson, (2003) hence a semi-structured interview approach was used to further support in gathering data and evidences. A list of people were selected across the departments. In the interview, Lean practitioners, improvements participants, senior managers and process/policy experts were asked questions that enabled them to describe their thoughts. A summary of discussions were then recorded in an excel database to be used for analysis at a later date.

Secondary data - Documentation/archives

In order to increase the reliability of the empirical evidence, Easterby-Smith *et al.* (2002) suggested that present documentation and archives could be used as supplementary information. They commented that supplementary documentation such as improvement updates, monthly status one pager, internal communication, newsletter can be used to gather facts and then these can be used for data triangulation (Easterby-Smith *et al*, 2002).

The secondary data was collected in the form of the improvement records (e.g annual company reports, 2011) of Lean projects, customer satisfaction index, post-implementation report and monthly management summary. It was noted that it was important to keep confidentiality and anonymity, and this was agreed at the start of

the study. All data was retained until the analysis step and then returned to their respective departments.

Field notes

Nieto and Perez, (2000) noted that case study research has an overlap of data analysis with data collection. Voss *et al.* (2002) supported this view and commented that field notes could be used as an ongoing commentary and recording the development of the research activities in almost day to day basis that includes both observation and data analysis. This approach was used and branded as a 'research log'. This log was captured on-going thoughts and emergent ideas as well as comments on the development and blockers of the research task. The research log was very useful and it guided the thinking to formulate the theory.

4.2.2.4 Data storage

Case study database

Woodside and Wilson, (2003) suggested that case study materials should be organised and stored appropriately so that it could be used at the data analysis stage. Soft copy-database and a hard copy document-database were created that stored case study documents, the research log, and transcriptions. This helped to record information to refer at analysis stage. The soft copy-database was developed using Excel and can be found in Appendix B 1.9.

The above data collection and data storage approaches were useful for data triangulation. Data triangulation is important in research design as claimed by Eisenhardt, (1989). He stressed that research output should be referenced with existing reality and also should be considered for the approach of how data was collected and how much it should be trusted. The next section describes triangulation approach and includes the constructivism, reliability and validity concepts that were discussed earlier.

4.2.2.5 Data analysis – verification, validation and triangulation

Nieto and Perez, (2000) emphasised that data analysis is important for building theory from case study and it is the most challenging and the least organised part of the research.

Nieto and Perez, (2000), and Woodside and Wilson, (2003) recommended the standard techniques that consist of within-case and cross-case analysis to be used for case study research approach. These are explained below:

- Within-case analysis

    The aim of within-case analysis as claimed by Eisenhardt, (1989) is to describe the existing phenomena observed from case companies. Therefore, the first task is to organise empirical data into an understandable and accessible format. Orosz, Miles and Huberman, (1997) argued that archives should also be integrated and triangulated to enhance the reliability of evidences. In this study, interview transcriptions was reviewed iteratively to search for particular themes emerging from case studies.

    Woodside and Wilson, (2003) suggested that all case studies be analysed in the same way and follow the same structure. They commented that a researcher can then look for any emergent patterns before generalising patterns across the cases. Hence, Lean projects from different departments were gathered and compared to identify any insights into how the case study company has deployed Lean.

    A report was constructed to provide the basic description of Lean adoption. The empirical evidence was kept in a database since this was needed later on for cross-case analysis.

    Triangulation is rooted within the discipline of surveying (Blaikie, 1991). In terms of social science approaches Jick (1983), Morse (1991), and Massey (1999) argued that the purpose of quantitative methods is to view a phenomenon from multiple perspectives using multiple and, if possible,

combinative processes. Morse (1991), and Massey, (1999) added that this technique allows the researcher to investigate the research construct in closer proximity, facilitating greater clarity via these different viewpoints.

Furthermore, Jick (1983), and Mile and Huberman, (1989) defined triangulation in terms of: data triangulation (assessing the consistency of data with respect to changing contexts); methodological triangulation (the application of different research methods and processes in order to increase confidence in the elicited result data); and theoretical triangulation (the application of different theoretical or philosophical perspectives in interpreting the data).

Mile and Huberman, (1989) explained that the antithesis of any triangulation method used is to provide control over the research process in terms of the validity and reliability of the data gathered. Jick, (1983) confirmed that a weakness in one method or point of view, can therefore be supplanted by a stronger method or view, which overcomes or rectifies the deficiencies of the first in a holistic manner.

In the case of the research design within this dissertation, a methodological triangulation as opposed to a theoretical approach has been used. This is typical of the qualitative approach seen in literature, wherein human interaction to acquire data is supported by additional techniques (e.g. using a survey to validate and confirm the results arising from semi-structured interviews). Given these preceding definitions, the most appropriate protocol was chosen for the research method. The nature of the research was stressed to each participant beforehand, as well as the reason for selecting them as a participant and the need to record their responses for evaluation and analysis later. In capturing the case data via the given protocols, it should be borne in mind that each approach was mutually exclusive, yet supportive of the other as shown, and this is shown in Figure 4.3, which shows the overlap or method of triangulation used within this research.

- Cross-case analysis

    Mile and Huberman, (1989) suggested that the cross-case analysis should be carried out to analyse the empirical data through the use of structured and diverse lenses and to search for cross-case patterns. Nieto and Perez, (2000) agreed and suggested that there are different approaches such as tabulation and matrixes that can be employed throughout the analysis process to cluster and organise data into an accessible format. They mentioned that these then allow units of analysis to be identified, which can be used to look at empirical data for drawing valid conclusions and to understand the emerging theory elements. They recommended that the unit of analysis should be at the lower level, focusing on common approaches and differences. This analysis should follow the cross-case comparison process (Nieto and Perez, 2000).

    Different approaches have been applied to look at empirical data. Tables and matrixes were employed throughout the analysis process to cluster and organise data into an accessible format for drawing valid conclusions and emerging theory elements. It was noted that the case study database was helpful in visualising the data from different dimensions. The unit of analysis at this stage is considered to be the Lean project.

For this research, a variety of approaches and techniques were used for data collection. The transcribe notes were recorded after each interview and then examined in an iterative cycle. This can be seen as the bottom part of Figure 4.3.

Each response gathered from interview was verified with research aim and objectives, depicted as 'Read' and 'Relate' stages of the iterative cycle in Figure 4.3. Based upon the responses and information in transcriptions was compared and it was either rejected ('Reject'); or flagged to discuss and 'Resolve'; or selected to be included in 'Representative' as a verified and validated data.

It was noted that if there was insufficient or inconsistent responses for example if it was said that 'I don't know, need more information' then a follow-up was done by revisiting the department and clarifying with participant. Most of the clarification that

was required was for understanding different roles and responsibilities for executing Lean initiatives. When it was discovered that the responses were not factual, it was rejected. This iterative cycle continued until sufficient case data was collected for the central theory.
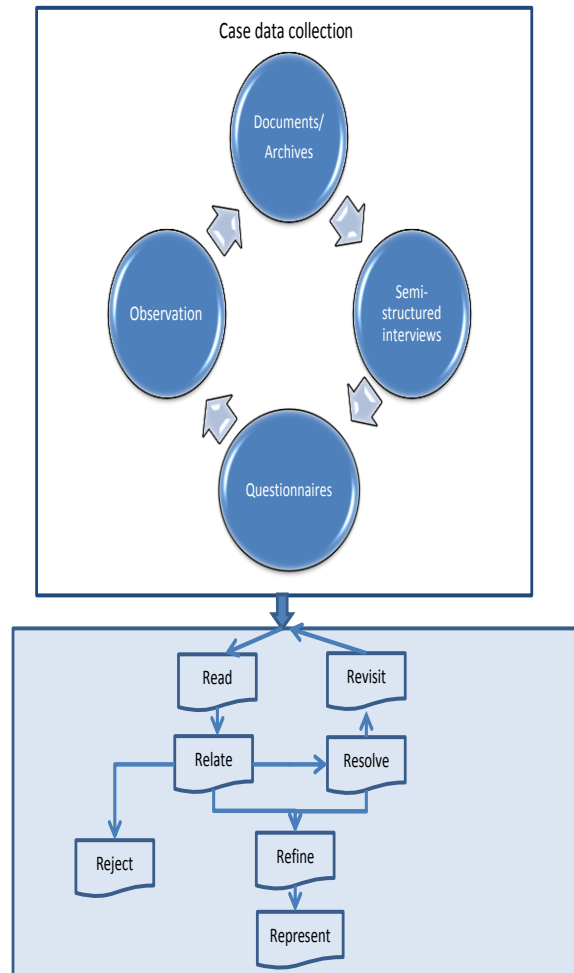
Figure 4.3: Representation of the data collection approach and refinement cycle (triangulation)

4.2.2.6 Research design model

The reviewed literature provided a context for this research presented. The Figure 4.4 depicts this research in detail including research design, research methodology and research questions. This is in line with Yin's view of the research design that asks how, what and why questions. He explained that 'how' questions answer how research should be carried out; 'why' questions considers the importance of

research; and "what" questions aid the conclusions that can be drawn from the data analysis.

Because the purpose of this research is to explore in order to understand how Lean has been deployed for service quality improvements, within the airline company. The literature that was surveyed in chapter 2, and a conceptual framework that was created in chapter 3, and identified two research themes. Therefore, the data collection and data analysis chapters tested speculations against the framework designed in chapter 3 (Figure 3.2) and generated relevant context-based questions.

As shown in Figure 4.4, the research takes an empirical case study approach for data analysis. Qualitative information from the three departments were gathered and used as evidences for understanding Lean deployment in the airline service. This research therefore seeks to verify and enhance the framework shown in Chapter 3 - Figure 3.2 in the context of Lean deployment for service quality improvements as the central theory.
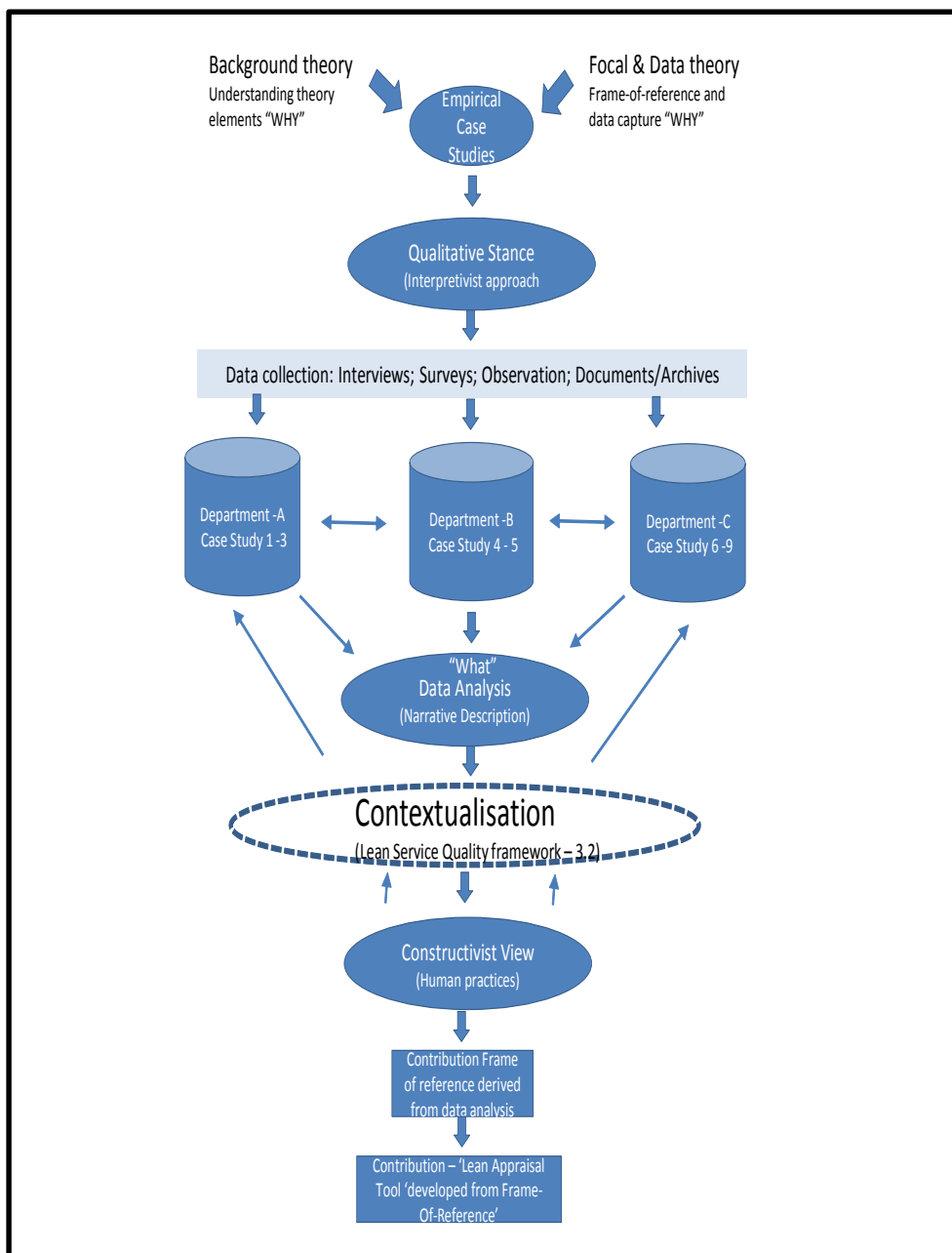
Figure 4.4: Research Design Model

The sources of information gathered through semi-structured interviews, and participant observation with interpretation of delivery of a number of Lean initiatives with a narrative approach taken for the data analysis. The classification for the gathered data in terms of influences of Lean deployment as outlined in the central theory. This was discussed in chapter 3 in Figure 3.2. The table 4.2 summarises the research components and references the research model.

Table 4.2**:** The research components summary

Research Component	Detail
Scope and Timeline	Airline organisation context - case study participants : ad hoc "snapshot" in time over 8-12 weeks
Philosophy	Interpretivist - Qualitative with an ontological stance taken to frame the data sources
Methodology	Empirical qualitative case study to test the theoretical framework (presented in Figure 3.2, chapter 3)
Data collection	• Background theory / literature review • Selection of case participants – experts and relevance to the context of the research • Documents • Semi-structured Interviews (conversational style) • Observation • Survey – questionnaire
Data analysis	• Explanation-building, iterative refinement of the central theory • Validation and verification of the data gathered using methodological triangulation

Source: Sharif, (2008)

The tabulation provided a focus for the research design and was referred through the data collection and analysis phase of the study.

4.3 Summary

This chapter included the discussions on how the research is going to be carried out for this dissertation. The data was gathered via qualitative instruments of observation, semi-structured interviews and quantitative instrument such as surveys. Using a qualitative approach for data collection with use of protocols led to refinement and analysis of the case data against the research questions and central theory. An explanatory and narrative form of data analysis was used against the conceptual framework of the central theory which is recorded in chapter 3 - Figure 3.2. The extent of the validity, reliability and triangulation approach was discussed specifying its importance for the case studies. Finally, a table was presented that contains a summary of the key research approach components with a presentation of the research view.

CHAPTER 5 : LEAN DEPLOYMENT

This chapter describes nine cases related to Lean deployment within the airline company. By doing so, it highlights the Lean implimentation approach and identifies dependencies. The main aim for this chapter is to gain an understanding on how Lean has been adopted into the airline company. This is achieved through gathering empirical data by employing various data collection techniques as discussed in the previous chapter and then analysed the information. At this point, refer to chapter 2 section 2.3.2 that included a detailed discussion on issues on Lean deployment for service quality improvements together with discussion on performance measurement framework. This chapter then outlines specific Lean deployment components that are being used into the airline company which are inherent for improving service quality. This chapter includes conclusion by comparing the findings with the central theory defined in the chapter 3 section 3.2.

5.1 Background on the departments

For this research, nine cases from three departments were selected to investigate and understand Lean deployment within the airline company (see section 5.2). The following section covers the background on each department and discusses how Lean has been adopted in to their business area.

Department – A

During the interview with the Senior Manager of Lean CI Team where he commented that due to the financial crisis surfaced in 1997 followed by the security threat in 2001, the airline company's leadership team directed their focus on improving financial as well as operational performances (Senior Manager of Lean CI Team). The Department A took an initiative and formularised objectives to create a focus within the department. 'Putting People First' (PPF) – a change programme – was initiated in 2001 and the Department A created operating framework to follow it through. This programme aim was to shift the department's position and excel with competition to strengthen the company's position in UK, albeit within Europe. Therefore, the first step taken for the PPF programme was to rebuild the foundation

and address underline issues that hindered financial growth and created roadblocks for operations.

Within Department A, some observations have been made that pointed out that a number of tools and techniques have been applied, taken from various business improvement methodologies in order to focus on the process efficiency and improvements in service quality of their operational process. This quest for improvement attracted leaders of the department to Lean.

To institutionalise Lean, approximately 60 operations managers were sent on Lean training, and started a small handful of Lean initiatives. These initiatives highlighted a number of improvements 'low hanging fruits' that could easily applied and benefits could be realised in a short time frame. With this success, the team's focus shifted towards starting medium-size improvement projects and stepped up in the improvement wave.

It was explained that the PPF programme is supervised by the 'Change Programme Board (CPB)', attended by the executive committee members and the senior executives. The CPB was created to provide the overall direction on Lean strategy, review and sign-off the project charter (a document that includes the high-level requirements for the project and links the project to the on-going work),and resolve resource issues, monitor improvement initiative and track expected improvement results.

To support the Lean movement, it is worth noting that how Department A carries out communication audits (twice a year) and understand the dynamics in place. To support these bi-yearly audits, the management team supported an idea for regular team meetings as a critical communication channel to listen to views and cascade information.

In total 35 projects were completed with some were very close to completion and some were still at initiation stage. The completed projects included changes into team structure, shift in roles and responsibilities as well as introduction to the new IT system. As a result the Department A reported a reduction in its operating costs, increased team participation and improvement in business throughput. However, the

increasing competitive conditions highlighted a need to increase productivity with a special focus on improving service quality. In summary, Lean methodology has been used as a strategy to drive efficiency in operations and improvements in service quality to meet with the Department A's strategic objectives.

Department – B

Historically, department B is recognised for initiating various improvement initiatives under the theme of 'Brand-Driven Employee Experience', with a focus on 'Employee Value', which is mainly driven by their Leadership team.

On the back of the reorganisation in 2007, an internal review of the effectiveness of Department B was requested by the new divisional director and posed a question *"what do we [department B] need to do to be exceptional and add outstanding value to the business?"*

The internal review highlighted that department B was working without agreed measures and metrics, and that the majority of its internal processes were not standardised and adhered. Hence, a recommendation was put forward to focus on certain areas and created three project streams: 1) leadership and talent procedures 2) process, metrics and measures and 3) knowledge management. To kick start the improvement drive, an external company was hired to coach the department's management team on Lean, problem solving, facilitation, team building, and coaching and mentoring.

Since 2009, 15 improvement initiatives have been completed. These initiatives resulted in increase in Lean awareness and as a direct result increased employee engagement. The gathered document reports indicated that more staff joined in their 'workout' initiative (name used for a Lean improvement initiative) and participated to improve their process. The comment written on project completion report suggested that people were encouraged to think about improving a process from their own viewpoint and were allowed to experiment. Although Lean adoption is at the early stage for this department, there are some promising signs. The 'workout' initiative appears to be a base for driving the change within the department. Indeed, this has

encouraged Lean's process-based concept to be accepted and created a momentum for change.

Department – C

The case airline carried out a survey in 2009 which indicated that eastern carriers are rated better in long-haul customer service. This feedback pinpointed a general feeling amongst the premium customers that they felt undervalued and as a result were questioning the value of the case airline company's service premium rate. In response to the survey result, the leadership team of department C renewed their sales and marketing strategy to reflect a master brand and customer intimacy. They believed that this change in strategy would increase focus on their customers and at the same time will provide an opportunity to engage with their sales regional managers to add emphasis on focusing on customers and delivering services with quality.

Looking through historical records it can be deduced that Department C's senior manager agreed with the internal department to loan a number of process improvement experts to provide consultancy and kick-start their improvement initiatives. The engineering department loaned two green-belt Six Sigma-trained engineers and started initiatives following the Six Sigma approach. Due to heavy emphasis on statistical base data analysis, a number of members from the department found the concept hard to follow (this comment was recorded on issue-observation log). It was felt that they were spending more time collecting data and putting it into Excel spreadsheets to monitor and less time was spent on actually 'doing the doing'. The management team observed that the result was a further degradation of worker morale and customer service quality proposition. Based on advisors recommendations, senior management moved towards the broader and proven Lean approach.

From the documentations it can be seen that since the department had already spent a significant amount of time and money in other (unsuccessful) change activities, there appeared to be significant resistance with Lean introduction from

internal stakeholders as it was seen as yet another improvement approach. It was noted that both management and staff were sceptical of Lean, and belief was set that no real benefit would be realised through Lean.

5.2 Selection of the cases

The selected three Departments are Customer, People, and Sales & Marketing. They were selected due to these departments had relatively mature Lean programs in comparison to other departments and gained permission to access cases. These three departments had different focus (internal and external) therefore it would provide internal and external dimensions on Lean spectrum for this study. From this point onwards, these departments will be represented with codes A, B and C with the selected projects that are coded accordingly and will be referenced in the analysis stage, as listed in Table 5.1. The documentation collected on each of the following cases was recorded into a case study database (see Appendix B 1.9) and a summary is tabulated in Table 5.2 below.

Table 5.1: Lean projects code

No	Case study Departments	Service quality improvements initiatives	Code
1	Department A	eTicket refund process	PA1
2	Department A	Customer Service Process (CSP) improvement	PA2
3	Department A	Customer Service Recovery process improvement	PA3
4	Department B	New Starter IT Provision process redesign	PB1
5	Department B	Leadership Development	PB2
6	Department C	Customer Focussed Selling process redesign	PC1
7	Department C	Multi-channel sell and service process improvement	PC2
8	Department C	Online Campaign process review	PC3
9	Department C	Tactical Promotion process review	PC4

Table 5.2: Summarised information on three departments

Criteria	Department A	Department B	Department C
Key objective of Lean adoption and observation	☐To focus is on services quality Lean approach has been included as part of the Department's strategy. Business process improvement is done through focusing on customers Internal-External focus – passenger and front-line staff are customers	☐ To improve efficiency, effectiveness and productivity of people of the Airline Company Internal focus – Employee is a customer	☐ To improve cost efficiency and resource effectiveness and productivity ☐ To increase market share Internal-External focus – sales agents and 3rd party companies are customer
History of business improvement approaches	☐Quality control (management) ☐TQM (individual projects) ☐Lean	☐ Change Acceleration Programme (CAP) ☐ Lean (with Six Sigma implementation cycle as methodology)	☐ BPR ☐Six Sigma ☐ Lean
Characteristic and structure of the project team	☐ A member from the central Lean team is loaned to the Department who are responsible for facilitating Lean improvements ☐ Project team members formed from different Departments (cross-functional team) and led by Lean team member ☐ Aim is to train people on Lean and assign them in projects/initiative within the sub department teams	☐ Some members of the Department are trained on Lean and now lead people processes development projects ☐ Each project tends to have its own improvement team with central Lean team member as a coach if required	☐ Lean team member is part of improvement team ☐ Cross functional project team formed and led by a Lean team member
Critical success factors	☐ Leadership commitment and engagement ☐ Regular communication ☐	☐ Leadership involvement ☐ Change	☐ Knowledge and understanding of business improvement

	Knowledge and understanding of business improvement methodology within the Department and know-how of Lean tools	management experience ☐ Focus on people management, policy and structures ☐ Growing knowledge and understanding of Lean	methodologies (BPR and Lean) ☐ Coordination of improvement activities and process standardisation
Feasibility for using this Department for case study	☐ Lean is the main methodology ☐ Lean has been widely adopted in different sub Department teams ☐ There are a number of successful Lean projects and historic case material is accessible ☐ The data is available on current initiative ☐ Able to gain access but there is a confidentiality issue related to data in some cases	☐ Lean has been adopted in specific projects ☐ Able to gain access ☐ Provides perspectives on employee focus projects	☐ The first Department to adopt Lean prior to the heavy investment in IT ☐ Planned to adopt some techniques of Six Sigma in 2012 for measuring and monitoring ☐ Able to gain access with some confidentiality constraints

5.3 Interview responses

This section and subsequent sub sections shares the results from the empirical approach taken as discussed in chapter 4 for data collection activities. The gathered data are segmented in three parts; initiation, execution and evaluation. The protocol (see Appendix B 1.1) was composed and used within this approach for observation and semi-structured interviews (detailed in Appendices B 1.1, 1.2 and 1.3). The transcription was then cross-referenced with gathered documentation and archive information and fine-tuned (see Appendix B 1.9).

5.3.1 Department A - Project initiation

The initiation of the three projects within department A shared various combinations of factors. Five initiation factors were observed (vision, top leaders commitment, customer demands, market conditions and team involvement). Firstly, through the vision of the senior manager (SMA1), the improvement projects were started. The two team leaders stated that *senior management* is recognised as the most important factor for initialising Lean initiatives in their department. This supports the view of Jones and Mitchell's (2006) who indicated that the support from top-down management is of paramount importance for initialising improvements. Secondly, the team leaders added that in order to enhance customer experience and therefore improve their satisfaction, it is critical to focus on improving the *operational processes*. They added that one of the key objective for their improvement initiative was to optimise their operational process i.e. cycle time. They added that this was the case for eTicket process that ensured the speed of the eTicket refund response and approval process to meet and exceed customer expectations. The third factor can be considered as customer *demands and expectations*. Keeping the focus on customers, senior managers with some team leaders confirmed that the department is encouraged to provide better experiences to customers for meeting their needs and expectations. They added that PA2 and PA3 projects started through collecting data from the on-board survey (Voice of Customers - VOC). CA2 added that this was also complemented by the periodic data gathered from call centres across the globe. Fourthly, the department is also pressured by Sales and Marketing department who provide information from competitor analysis / bench marking data that adds as another factor for improving the service quality for our products/services. As such PA1 was started to keep our market leader position for using technology for providing a faster responses to refunds (CA2). The fifth factor is *team involvement as claimed by two team leaders.* Team members should feel enthusiastic about the changes they were introducing and reciprocate that their contribution counted towards bottom-line improvement (CA2, CA3).

5.3.2 Department A - Project execution

In department A, the implementation step was supported by in-house developed framework that included five stages and uses evidences from three investigated projects. The steps are similar to Six Sigma methodology, shape, measure, analyse, implement, and control.

5.3.2.1 Shape

From the archived documentations, it was deduced that the objective of this step is to shape the improvement initiative. In this step, the evidence gathered, the company's vision and departmental objectives and improvement objectives were revisited to check if they were aligned. The 'Critical to Quality' (CTQ) attributes were identified and translated and used as a goal for improvement. To define the CTQs, three criteria were considered. The first criterion was to collect and understand the *Voice of the Customer* (VOC) data. A range of data collection methods were used that included surveys for two projects, and data gathered from Customer Relations unit and Call Centre. The customer survey results were used as supporting data in PA1, while in the case of PA3, additional market research was used. The *Voice of the Employee* (VOE) was the second criterion where information was collected through interviews and a yearly organisational employee satisfaction survey. The VOC and VOE were translated into CTQ for department A is presented in Table 5.3.

Table 5.3: The details on the improvement projects

Project	VOC	VOE	CTQ attribute
PA1	☐ To get a refund of purchased ticket takes long time compared with other airlines.	☐ The existing refund process is resource intensive that requires manual intervention as it is complicated to complete. ☐ The account settling process requires too many approvals.	☐ Customer will receive refunds within 48hours after submitting a request. The process will use on-line proposition and will require minimum manual intervention
PA2	☐ Customers prefer to have prompt crisis service provided at the time of flight cancellation or any other casualty before travel	☐ Its time consuming to gather all the equipment and not knowing who is the point of contact – takes on average 20-30 minutes per shift ☐ Only a handful of customer champions are trained to brief and provide equipment at the beginning of the shift ☐ While there is no web system, a lot of time is spend on booking a slot and waiting for confirmation	☐New on line booking tool will book a slot and get approval at the same time, will shorten the waiting time by 90% ☐Customers will experience more support and guidance at the crisis period ☐ Training course will be rolled out to more people and more information available prior to the shift
PA3	☐ Customer Satisfaction survey commented that other airline s recognises – the premium passenger immediately on board at point of failure that leads to higher levels of customer resolution	Crew Satisfaction – provide the crew a tool to help them mitigate the situation on a full system failure	☐The loyalty indicator will be increased by 20% after the new process has been embedded ☐ Reduce backlog of requests

Further to the VOC and VOE, it was confirmed that defining CTQ with criterion helped to align with department's strategies. The team leader (CA2) confirmed that

the CTQs were approved prior to moving to the next step and were included in the project charter.

5.3.2.2 Measure

This step's objective is to investigate the measures that were used in measuring the performance of the operations process and cross reference with the CTQ defined in the earlier step (CA2). We used *Process Mapping* techniques in all projects to identify process activities from the end-to-end perspectives and as a result we identified operational problems that were affecting us operationally (CA1, CA2). Process Maps were created using a tool and used 'process chart' as a techniques. The process validation was carried out through *walk-through of the* process by operations employees. To define measures we used *brainstorming techniques in a workshops environment where we had the* improvement team and the business owners as participants (CA1, CA2, and CA3). Key measures were defined using three categories: 1) cycle time, 2) delay rate, and 3) resource usage (CA2, CA3). The Work Study method, Value Stream Mapping and Pareto Chart were used as sets of tools and techniques to support this step. It was also commented that Excel programme became an integral to support the statistical data collection and analysis previously we were using a manual approach (CA2).

5.3.2.3 Analyse

In this step, the root causes of the problem were identified and the data was collected to provide as reliable evidences (CA3). For example, in PA1 and PA2, route cause analysis (fishbone analysis) was carried out to highlight the problem areas. For example, analysis of PA3 problem through fishbone diagram helped to visualise and provided rich data that was necessary for justifying the critical areas of improvement (CA3).

In this step we collaborated with the engineering department and a sponsor (SMA1). It was deduced from the archive records that the data analysis applied in this department was less in comparison than when compared with the other departments'. Furthermore, human factors were often not taken into consideration;

more focus was on data. CA1, CA2, and CA3 agreed with the made observations and they added that: *"we should incorporate the analysis with data and business requirement, together with human factors, to broaden the range of analysis for improvements".*

5.3.2.4 Implement

In this step analysis results were used to generate alternatives as solutions to the problems within the existing business processes. The solutions had four categories, as shown in Table 5.4.

Table 5.4: Four types of improvement solutions

Improvement solution	Objective
Quick fix solution	Employ less efforts and less cost – pick the low hanging fruits.
Process redesign/ Process streamlining	To eliminate waste in current working practices and create a flow to deliver value to customers
Process Reengineering	To radical change the process and redesign workflows within and between business functions in order to optimise end-to-end **processes** and automate non-value-added tasks
The development of supporting IT system	To incorporate technology solution to enhance the operational process.

CA1, CA2, and CA3, these Team Leaders explained that because of the low investment cost, we selected solutions that fit in quick-fix solution category and this was in agreement with stakeholders. However, we have also considered process reengineering category in the case of PA1 where we favoured IT system as improvement solutions. CA3 commented that:

> *"The biggest problem has been a degree of resistance from those who did not participate. Our aim is to achieve the highest improvement value in terms of cost/benefit, reflecting to all stakeholders' requirement. And for that we obtained approval from CPSC before executing the improvement solution" (CA3).*

5.3.2.5 Control

This step has two tasks 1) to establish the control plan, and 2) monitor, and summarise the results of the project. It was observed that once the improvements were identified, the project team developed the business change plan. This recorded the change in their current working practices. The improvement team monitored the improved process for approx. 15 weeks and then transferred the ownership to business areas (CA1, CA3). This transition period is an important and crucial step for sustaining the improvements, stressed by SMA1, and CA3).

The project team provides summary of the results with their benefits which was stored as a documents into an archive records (CA2). The archived documents were reviewed in which three types of benefits were identified: hard savings, potential savings, and soft savings. The potential and hard savings were explicitly reported in monitory terms, whilst the 'soft saving' was recorded as enhanced customer satisfaction, but was not quantified with any forms of statistical data, it was noted.

These findings also revealed that there is a lack of constructive measurement of project outcomes or improvement results. This issue could affect the sustainability for improvements, future continuous improvement and therefore impact on Lean adoption within the company. The next section covers a discussion on how improvement projects are evaluated within the department A.

5.3.3 Department A - Project evaluation

Empirical evidence gathered from the documents and reports highlighted that the three criteria were used to measure improvement results. First, measured by *internal operations that focused on* the operational dimension (operations process), and second the employee dimension. The measures used for operations dimension were reduction in cycle time in the case for PA1 and PA2, meeting measures for service level agreement in PA2 and PA3, reduced work in process in PA1 and PA2, removal of transactional errors in PA1, and eliminating non-value added activities in PA1 and PA2. The employee dimension was used to measure scale improvement in

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communication, leadership style, work environment improvement, productivity improvement, and skill development that resulted from Lean initiatives. When asked *"why do you measure these?"* Team Leaders pointed out that the measuring employee dimension helps them to overcome resistance, and to resolve any further implementation issues that perhaps jeopardise to embed the solution effectively (CA1, CA2, and CA3).

For deploying Lean as an improvement methodology, the *customer dimension* should be an important measure for project outcomes, pointed out by a Lean change agent and this should be the second criterion. Though it was noted from the empirical evidences that less attention has been given to the customer dimension. When prompted, a senior manager commented:

> *"Theoretically, the measurement of improvement project outcomes from a customer perspective is useful in justifying the true value of a project. From the business viewpoint it is sometimes not worth investing a lot of money to measure the outcomes of the specific project"* (SMA1).

The *cost dimension was* identified as third criterion. It was further categorised into three types: hard savings, potential savings, and soft savings. It was observed that the first two of these were converted in monetary value. For example, removing non value added activities in PA2, was calculated to net an annual saving (a hard saving), a potential saving was calculated as removing duplication of activities, and increase in customer satisfaction (a soft saving) was considered by improved loyalty that can be translated into a long-term profitability with repeat business. From the documentation, it was evident that cost-saving was the most used criterion for evaluating improvements. To confirm this observation, the project team leader commented that:

> "*The senior manager will justify the success of an improvement project by considering the amount of money saving after executing the improvement solution. This is very crucial in order to achieve the cost saving goal that is why it is an important project evaluation-assessment criterion"* (CA3).

The management team's focus was cost savings, rather than looking at the measures that are related to customer and employee satisfaction (CA1, CA2, and CA3). CA3 acknowledged that a customer is not directly perceiving the improved service quality resulted from the improvement project but agreed that the improvement in service quality does have impact on customers' perceptions in the end (CA3).

A team leader, CA2 who was also a change champion shared his views from his previous experience and said that:

> *"What is missing from the Lean implementation in this department is capturing how employees feel. This is very important if our aim is to create a continuous improvement culture. An organisation with a positive and enabling work environment can help employees feel that they have some level of ownership over how the organisation operates A positive and enabling work environment is positively linked to satisfaction with the organisation, job satisfaction, work behaviour, performance, a sense of belonging and discretionary behaviours (also known as 'organisational citizenship behaviours')"* (CA2).

From the evidene, it can be agreed that indeed this is a significant point and should be considered to further   understand the ways in which a Lean project improves service quality. Both internal and external customer's perspectives should be considered.

5.3.4 Department B - Project initiation

It was noted that Lean has become a part of department B's culture, which is dissimilar from department A. However, the initiation factors do share some similarities. To explain this, the senior manager said that the improvement project was supported by two levels of employees (SMB1), as recorded in Table 5.5 below.

Table 5.5: Two tier groups – constructed from the SMB1 viewpoint

Employee Tier	The initiation of improvement project
Management Tier	Improvement Team focused on identifying the team management problem. They did that through applying Go-Look-See practice.
Employee Tier	Once a year employee satisfaction survey results such as New joiner's selection, on boarding and training service information, skills development and on-line training material.

Within this department, it is observed that the first project initiated bases on both type, high *demands and expectations* from management and new employee, and *operational process problems* that needed improvement in the new joiners' induction programme. PB2 triggered from management community requests where as PB1 was initiated through operational process problems that were observed by the operational team. The *highly competitive market for attraction and retention* was the third factor which provided a reason for the department to improve the PB1 business process. In the first meeting with SMB1, where the topic of employment trends was discussed, SMB1 stated that:

> *"Employee-employer relationship is evolving/changing to partnerships. Since organisations move forward into a boundary less environment, many companies competing for talent. The ability to attract, engage, develop and retain talent has also become increasingly important for our organisation"* (SMB1).

In support of this point, the senior manager (SMB1) commented that due to the competitive market and the 'net promoter score' (NPS) results, PB2 was started. The objective was to understand the existing market situation through comparing ourselves with other competitors. In support, the expert commented that the departments' projects were initiated under the standard recruitment policy and tailored to the different regions (EB1). Thus, the top management and the centrally governed recruitment policy could be considered as factors for initiating projects within this department.

5.3.5 Department B - Project execution

This section covers the execution steps for two department B's projects. In contrast with the previous department A, department B has more years of experience of the adoption of business improvement methodologies, hence they applied a hybrid implementation approach.

It was observed that the implementation cycle consisted of five steps, which is similar to the DMAIC of Six Sigma with slightly different terminologies, as documented in Table 5.6.

Table 5.6: The implementation cycle at Department B

Step	Improvement cycle
Identify	Identifying the Voice of Employee (VOE)
Measure	Gaps for improvement
Define	Improvement solutions
Select	Select the improvement solution
Maintain	Maintain performance

5.3.5.1 Identify

The documentation and views of Lean champions identified issues with staff involvement during the early stages of a Lean project. When asked the explanation of the challenges, the Lean champion stressed that:

> "*Staffs need to be involved in Lean project early on for a number of reasons. Staff not included can feel left out of the improvement process, occasionally resulting in a lack of commitment, resistance to the improvement ideas generated and failure to comprehend the different approach to improvement. Additionally, Lean improvement is intended to be a 'whole system' and there are both behavioural and technical reasons for requiring participation from all relevant groups or departments. Partial engagement may lead to sub-optimal improvement*" (CB2).

The senior manager of department B reinforced the employee's involvement point and commented that:

> *"Involved employees are engaged and they are productive, active and connected—in other words, indispensable. It is good business sense to invest in engagement as an integral part of working practice. Our organisation should see the connection between engagement and company performance and that will be the ultimate advantage"* (SMB1).

To support this view, a team leader (CB1) commented that at the start of the improvement project there were a different viewpoints for involving staff and to keep the momentum of change. The team leader stressed that the timing and duration for involvement was crucial for the Lean improvements as it reassures that the approach is understood and then supported from the start (CB1).

The empirical evidence illustrated that prior to the Lean initiative Voice of Employee (VOE) data was collected. This highlighted the most important attributes from employee's perspective and identified various sources for information. For example, internal survey and NPS scoring in PB2, complaints information gathered in PB1. A senior management (SMB1) stressed that the NPS method is a useful approach that helped in benchmarking with other leading organisations. To support this view, both, CB1 and CB2 commented that the NPS feature was different from the regular customer survey that is most commonly applied in organisations. They added that the VOE collects employees' perceptions on current process that then helps to find potential improvement areas. In essence, VOE provides justification for critical to quality (CTQ) before proceeding to the next step for improvements (CB1, CB2).

5.3.5.2 Measure

This step measures the performance gap and identifies the areas that require improvement. Both, CB1, CB2 commented that in this step, the cross-functional team's consensus is used to justify the gap. The cross-functional team gathered the both quantitative and qualitative data, which was based on defined CTQ.

The conversation with the senior manager from the department B who pointed out that:

> *The measuring approach we used includes collecting statistical data. It is also important to gather the qualitative data from the operations process such as employee perception, site-visiting results, and our*

observed issues. Particularly in our kind of services, we should be employing both types of data to identify possible areas for improvement and sustain the existing improvements" (SMB1).

When asked, how do people feel when they are either tasked to gather the measuring data or are subject of measures? The SMB1 responded:

"When employees have a higher job satisfaction they are closer with the organisation and seek to maintain employment relationships. There will always be polarities in organisational life, such as the need to maintain stability and change, concern for people and for task, for internal cooperation and external competitiveness. It is normal to prioritise one end and minimise the other. However, it is the role of our leaders to create a balance to ensure that we do not value 'tasks' and 'processes' over people.

5.3.5.3 Define

From the department's documents it can be deduced that in this step, a number of improvement solutions are identified in response to the gaps identified in the Measure step. CB1 and CB2 both commented that the first thing is to identify the *root cause* of the problem and data is analysed before we get involved in identifying any *possible solutions*. They elaborated further with one example of the internal survey for the project PB1, where data was coded and categorised using the responsiveness, turnaround time, as a predefined criteria. In this case, based on employees' viewpoints, the reasons were then categorised as 'like' or 'do not like'. Upon further analysis of this data in the PB1 project, we listed some improvement ideas that fitted within *quick-fix* and *process redesigning types of improvements as shown in the Table 5.4.*

5.3.5.4 Select

From the archived information it was noted that in this step the improvement team worked collaboratively to select the most appropriate solutions. To further explain, CB1 & CB2 both commented that an equation is generally used in selecting an approach for improvement and keeping a balance between the 'quality' and the 'acceptance' level of the project. This is shown in Figure 5.1
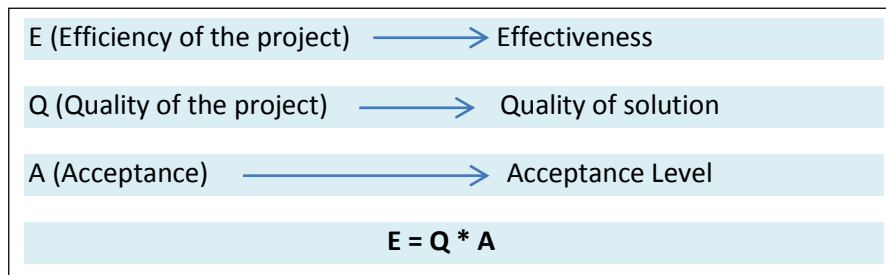
Figure 5.1: The project selection equation

They added that after selecting the solution, *pilot testing* is done prior to full roll out. CB1 commented that the objective of pilot testing is to *test with a smaller group first, collect* feedback, fine tune the solution and then execute the full roll out (CB1).

5.3.5.5 Maintain

After improvements were implemented, the archived reports suggested that measures were set for the improved process. When enquired the objectives for this activity, CB2 responded that this helped to monitor the operations process and ensured service delivery is consistent and the standards were applied. He further added that this is similar to the control step of DMAIC.

In order to transfer knowledge and embed the change, CB1 added that we use change acceleration process (CAP) training programme to raise awareness on how to manage change. It was concluded that this step was critical for embedding improvements. However, evidences suggested that there was little focus from the management. The next section discusses how department B measures the results of the improvement initiative.

5.3.6 Department B - Project evaluation

From the collected documentation, it surfaced that two aspects of an *internal operations dimensions* were explicitly measured. First, operations processes were measured using the standard measures such as cycle time, improvements into end to end processing time, elimination of non-value added activities in PB1 and PB2. Second, the employee acceptance level was another measure used to evaluate improvement project outcome. A number of approaches were used for example,

employee satisfaction survey which was targeted at different levels, on-site employee interviews was considered in PB1 and PB2. When discussed with the team on their views, CB2 mentioned that on-site interviews were useful as it provided an in-depth understanding on PB2 results.

During the discussions, CB1 commented that the outcomes of PB1 and PB2 projects did not impact on the *customer dimension*. However, both CB1 and CB2 added that the NPS score was used for measuring the overall satisfaction of employees in PB2. To understand this score, a request was made for further explanation. CB2 mentioned that it is difficult to justify a claim that an increase in employee satisfaction resulted due to PB1, PB2 projects directly, since the other factors such as work environment, reward, pay, and skills development may have contributed towards the employee satisfaction.

It was deduced from the gathered information that the most important criteria used in department B for evaluating results of the Lean improvements were the internal customer (*employee) satisfaction and cost saving dimensions*. The cost saving dimension point was supported by the senior manager who commented that the success of an improvement project is dependent on the cost dimension. He stressed that therefore all improvements made in operations processes were converted into cost-saving equivalents and presented to the top-management (SMB1).

A conclusion made that from *internal operations aspects, employee satisfactions and cost-saving* were considered important as two dimensions to evaluate Lean improvements. Empirical evidence suggested that the evaluative measures related to the employee aspect appeared under-represented, but it is recognised that it is important to include the employee aspect as evaluative measures for improvement projects.

5.3.7 Department C - Project initiation

It was observed that due to the absence of a core methodology in this department, each team conducted improvement initiatives using different approaches. From the gathered evidences it was concluded that there were four factors that supported project initiation. The first factor was the top management commitment. To explore

this point further, a meeting was organised with a member of an improvement team who commented that in our department the management provides guidance specifying that it should be shown in the following ways:

> *"By giving your time for the planning and identification of projects*
> *By having a vision and setting aggressive goals for your teams*
> *By unblocking any problems around the arrangements for the Lean projects*
> *By attending briefing sessions or delegating attendance*
> *By ensuring those who need time to carry forward the implementation get it*
> *By continuing to engage with the Team Leader post Lean project initiation about the progress and any road blockers for implementation*
> *By unblocking any problems around the implementation*
> *By attending the Final Report (project closure) out session" (CC2).*

To understand this point further a meeting was organised with a member of the leadership team. In that discussion, LC1 pointed out that the senior manager of each team is responsible for initiating the improvement initiatives. This initiative is aligned with the organisation strategy.

In response, the CC1 and CC2 elaborated further with reflecting on one of their past experience:

> *"When we were involved in delivering a Lean initiative, we noticed that some managers actually found it difficult to see their previous decisions being corrected by junior staff. A senior manager watched as the team withdrew a system he had championed. His lack of resistance (and indeed support) for the change reinforced perceptions of lack of management commitment within the team".*

To continue with it, CC1 commented:

> *"The style of Leadership is also important. If managers are seen to act as gatekeepers for all decisions, however minor, this may convey that the existing top-down approach to management has not really changed. Employees may need unambiguous signals that their empowerment is real. In our organisation, there are some instances where we observed that senior managers needed to have a better knowledge of the process behaviour. Without that they could have disregarded a valid improvement suggestion".*

The *highly competitive market* was named as the second factor. From the documentation it was deduced that this was due to an increase in competition and it

was a response made by the department to kick start improvement initiatives. To understand this factor, a meeting was held with a member of an improvement team who elaborated that the second factor is *high demands and expectations* placed by customers which has driven this department to adopt Lean's customer-focused approach (CC1).

The third factor appeared to be top down driven where senior management requested operational team to revisit their process since internal reports highlighted dip in their measured results.

The fourth factor appeared to be a requirement for making the process standardised within the department. The team identified different practices amongst the team members. They added that the sequence of the tasks were not flowing in the correct order.

CC4 confirmed that the first two factors were indeed key drivers for the PC1, PC2 and PC4 projects.

CC2 shared his viewpoints on the service process and mentioned that:

> "S*ervice processes use information or data and this process is often carried out by the IT systems support. The service itself is enabled only through technology. Hence, the processes, activities and subtasks are hidden behind IT systems and it is difficult to analyse them and identify the waste or the non-value adding activities. Invisible processes might also result in Invisible waste, which is much more difficult to extract and to standardise".*

He further added that the complexity of the service processes, as demonstrated in PC2 and PC4, caused difficulties in defining the performance measures. This point was further explained by SMC1:

> *"Performance measures drive personal behaviour and are thus key for controlling service processes. Short-term measures will lead to an optimisation of short-term behaviour and won't contribute to a long lasting improvements. He stressed that the performance measures should meet specific target".*

5.3.8 Department C - Project execution

In this department, it was noted that the execution approach was in contrast with departments A and B, but resembled to Six Sigma DMAIC methodology. This point was then confirmed by CC1 and CC2. This section therefore describes project execution steps as DMAIC sequence.

5.3.8.1 Define

This first step concentrated on defining the problems or opportunities. The team leader stressed that it is important to clarify goals of an improvement initiative considering data from Voice of the Customer (VOC) and for that we gathered customer views on the existing quality of our services (CC1). It became apparant that different approaches were used for gathering the VOC data. For example, a survey which was specifically designed in PC1 and PC3. Gathering customer complaints and Go-Look-See as a sight visiting for collecting data were applied in the case for PC2 and PC4. As a supporting evidence for identifying VOC, CC2 confirmed that a regular survey results are also used and added that it was important to identify the problems we encountered in the existing operation.

Looking through documents it was apparent that service quality was an issue identified a number of times. To understand this point further, a meeting was held with the Department's Operation Manager (OC3), who commented:

> *"Service quality depends on two people who are involved in giving and receiving (customer and employee). Many service processes are people intensive. From the Lean organisation's perspective people can be either belonging to the organisation or located outside the organisation. People inside the business need to be aligned with the Lean philosophy, which implies tangible and intangible components of goals for improvements. The intangible elements of implementing Lean in services are dependent on the moods of employees and how they feel at different points in time. This fact is also valid for people outside the organisation, meaning the customer receiving the service. He needs to give input for executing the process and his mood can also influence his opinion about how he perceived the process's quality".*

OC3 added that we used *Voice of Employee* (VOE) to identify people's points of views. To elaborate the concept of VOE further, the senior manager (E7) explained that:

> *"Since we rely on our people to sell and market our services and they are all on a different site, it is important to understand the process from those employees' perspective. This would reflect the real problems that occur in their market. The results would help us to justify the critical to quality problem that urgently needs improvement"* (E7).

The VOE was gathered through survey and interviews. The team leader commented that we always carry out interviews with employees at their base location because our sales manager and sales staff are located in different locations (CC1).

CC1 added that after both VOC and VOE collected, the improvement team prioritised problems/issues. This is then presented back to the business owner and the senior manager and the most appropriate CTQs problems are agreed before we move to the next step.

5.3.8.2 Measure

This step identified relevant measures for the CTQ which was defined previously. It was observed that these measures were different for example, some CTQs were pointing it to service quality during a service encounter for the case of PC1 and PC3, and therefore customer measures were in place. In PC4, the measures were designed to track the service quality provided by employees. The CTQ for PC3 was related to the problem occurred in operations.

Process mapping led to *collecting statics* for data analysis. The process measures were defined by the business owner (CC1).

5.3.8.3 Analyse

From the records, it was deduced that the statistical data analysis approach was used to identify the most significant problem requiring urgent attention. CC1 and CC2 both stressed that in the analysis of qualitative data, e.g. VOE was considered

rather than using only the reports found in the operations. It was evident that various analysis methods were in use that includes; a Root Cause Analysis in PC1 and PC4; Value Stream Mapping in PC2 and PC4 projects.

5.3.8.4 Improve

The main aim for this step was to select an improvement solution that fits well with the problem that was analysed in the previous step. The Team Leader commented that the solution is generated and selected with all stakeholders' participation (CC1). Furthermore, the selection used multiple criteria such as; investment in cost, operational impact, expected benefits, resource, ease of implementations, time required for implementation (CC1). Empirical evidences highlighted that solutions were categorised as specified in the Table 5.4. PC2, PC3 fitted as a quick fix solutions whilst PC1 and PC4 and some elements of PC2 required process redesign and PC3 had a requirement for an IT solution.

5.3.8.5 Control

From the gathered evidences, it was understood that this step had 2 further steps; to establish control and control plan and transfer the knowledge before handing it over to business owners. It appeared that the improvement team supported with execution of these activities. CC1 explained that the improvement team observed and monitored the process over a period of at least three months where key measures in the control plan was translated into performance-based measures and used for monitoring (CC1).

CC2 and CC3 both shared that despite initial scepticism, the change encountered little resistance with staff. They observed that staff valued the opportunity for both greater training and the responsibility offered to them for improving the process on an ongoing basis. They explained that the benefits of improvements were reported in the quarterly reports to management. CC1, CC2, and CC4 commented that an internal scheme for reward and recognition was used to further motivate employees to accept the change.

5.3.9 Department C - Project evaluation

Within this department, the improvement project results were evaluated using three criteria. The first criterion was the *internal quality dimension, assessed* through improvements in the internal operational process and considered employees perspectives. The second criterion was *customer dimension.* This measured 'what' customers received after improvements, such as speedy service, accurate information, and flexible services; and 'how' the customer perceived the improvements in services such as reliability, responsiveness, and assurances. *Income generation* was the final third criterion. The team leader commented that this is considered to be the most important criterion for business (CC1).

Empirical evidence shows that improvement projects were evaluated in terms of reducing costs, growth, and future potential growth. In PC2 and PC3, the improvement results were measured as reduced processing time/work-in-process/errors, and removing non-value-added activities. In PC1 and PC4 the focus was on reducing cycle time that helped to enhance the end to end sales service. The employee satisfaction data was used to reveal the change in attitude towards the improvement project in PC1, PC2 and PC4, the improved/enhanced skills in PC1 and PC4, and better communication flow in PC2.

It appeared that the customer satisfaction survey was used to capture the customer's point of view in PC1 and PC4. It supported the objective to investigate how the project outcomes reflected on the customer dimension that related to service quality. It was observed, however, that PC1 was not assessed through customer dimension.

In summary, it was noted that it is important to assess the results of an improvement initiative and as highlighted by the empirical evidences that it should be based on multi-dimensional criteria. The findings also emphasised that the integration of these criteria should be appropriate since this helps to sustain improvements and encourages a continuous improvement.

5.4 Cross cases consolidation

This section covers the empirical findings from the cross-case analysis activity. Orosz, Miles and Huberman, (1997) Voss *et al.* (2002) and Woodside and Wilson, (2003) recommended that for drawing valid conclusions from emerging theoretical elements, empirical evidence should be clustered and organised into an accessible format. Taking on board this recommendation, the cases were gathered, analysed, summarised and the results were stored in the case study database (see Appendix B1.9). Different matrices and pattern-matching methods for cross-case analysis were used and *department level* information was considered as analysis unit.

Three stages of the Lean project are discussed again to distil the critical findings, taking into account all three of the departmental cases. The findings from this analysis provided further understanding for the research goal which is recorded in chapter 1, section 1.3 – *'how can an airline company adopt the Lean strategy to improve service quality and enhance satisfaction for employee and customers?'*

5.4.1 Initiation of the Lean projects

As per the empirical findings it can be concluded that improvement projects were triggered due to the different factors and or combinations of factors. There were four initiation factors as follows;

Firstly, the *highly competitive market* was a primary factor and a significant driver in all cases. The competition records had three main sources: benchmarking in department A, market research (in department A and C), and the net promoter score (NPS) for department B.

Secondly, customer's *demands and expectations was another factor that appeared in these cases.* It was evident that customer demand/expectation was the driver for starting these improvement initiatives. Conversations with a number of senior managers concluded that meeting customer expectations provides an edge in highly-

competitive market for departments A and C. This was highlighted through benchmarking activity that triggered an initiative for enhancing customer experience. Information gathered through customer surveys, customer complaints via an in-flight survey channel and at a call centre and then compared with competitors benchmarked information.

Besides these the two internal factors were also highlighted. These were *top management commitment*, and *operational process*. The team leaders and internal consultants pointed out that the senior management commitment was the most important factor for starting an improvement initiative. They stated that the head of the department explicitly initiated Lean projects in departments A and C, and for the department B corporate headquarters policy was a key driver.

The problems within the operational process can be further divided into sub-factors. 'Competitors pressure' which was evident in the case of department A and justified through obtaining information from benchmarking exercise. The 'operational problems' was highlighted from employee interviews and site-visiting observations in both departments B and C.

In summary, in this stage, Lean improvement initiatives were not started because of individual factors but combinations of factors were a driving to start improvement initiatives. These findings have been listed into the Table 5.7. With this analysis and through empirical evidences, the understanding of how Lean improvements initiatives were conceptualised and factors that played a role for that initiation were identified. The four factors were grouped as 'external' and 'internal' factors, and are further described in the Table 5.7.

Table 5.7: The initiation factors of Lean projects

Initiation factors Criteria	External factors		Internal factors	
	Competitive market	*High demands from customer*	*Operational process problems*	*Top management commitment*
Improvement projects	PA3 PC1, PC4	PA1, PA2 PB2 PC2, PC3	PA1, PA2 PB1, PC1, PC3	PA3, PB2, PC4
Source of information/ Technique	1) Market research 2) Benchmarking 3) NPS score	1) Survey 2) Customer complaints feedback 3) NPS score	1) Bench marking 2) Site visit interviews	1) Vision and objectives 2) Senior Management commitment

5.4.2 Execution of the Lean projects

From the empirical evidences gathered so far it can be observed that the execution approach for Lean projects from all three departments was similar to the DMAIC methodology of the Six Sigma. Empirical evidence suggests that a slight different approach adopted by department B is because historically this department has adopted various other improvement methodologies.

The DMAIC terminologies have been considered for this section to record findings and use as a common approach. It was noted, however that these three departments followed a similar approach but used slightly different terminologies, see Table 5.8. For analysing the empirical evidence from the three department's cases, the comparison matrices and a pattern matching techniques was used.

Table 5.8: The Lean project deployment phases

Departments	Lean deployment phases				
A	Shape and Define	Measure	Analyse	Implement	Monitor
B	Identify (VOC/VOE)	Measure	Define	Select	Maintain
C	Define	Measure	Analyse	Improve	Control
Common phases of Lean project implementation	Define → Measure → Analyse → Improve → Control				

5.4.2.1 Define

Hensley and Dobie, (2005), Anderson *et al. (*2006) and Grima *et al.* (2014) observed that the objective of this step is to define the problem in the existing business that requires improvement. Nave, (2002) and Hensley and Dobie, (2005) suggested that stakeholders should identify the critical problem.

From the gathered empirical evidences it is clear that in the two departments most improvement projects started with understanding of the VOC information. It was evident that a customer survey and customer complaints were a source of VOC data. At department B, the NPS score was claimed to be a reliable source accompanied with site-visiting. The Team Leader (CC3) confirmed that surveys that sometimes triggered from benchmarking activities was used to collect the VOC/VOE information.

The evident shows that VOE was an important source and helped with justifying the CTQ problem. The VOE information was collected through face-to-face interviews as well as data from the departmental quarterly employee satisfaction survey. This was further supported by the yearly company-wide VOE survey. The important criteria for justifying the CTQ problem are listed in the below Table 5.9.

Table 5.9: VOC-VOE information source and common approach

Criteria	Voice Of Customer (VOC)				Voice Of Employee (VOE)		
Source of information/ technique	Specific-designed Survey	Customer complaints via call/service centre	Net promoter score (NPS)	Site-visiting	Employee interview	Employee Survey	Site-Visiting
Improvement projects	PA1, PA3, PB2, PC1, PC3, PC4	PA1, PA2, PA3 PC3, PC4	PB1,PB2	PA2,PB2, PC1 PC4	PA1, PA2, PA3 PB1, PB2, PC1,PC2, PC3,PC4	PA3,PB1, PB2, PC3	PA2, PB1,PC1 PC4
Common approach used to define CTQ							

From the gathered evidence, it is clear that the CTQ problem should be defined and agreed with all relevant stakeholders; this is in line with the suggestion made by Hensley and Dobie, (2005), and Antony *et al.* (2007). The evidences also confirms that senior managers approved all project charters that included the problem statement (CTQ), objectives, project goal, roles and responsibilities, and expected outcomes (benefits) with delivery timeline.

5.4.2.2 Measure

It is evident that this step identifies the key process measures. As recommended by Dahlgaard and Dahlgaard-Park, (2006), Mohamed, (2010), and Grima et al. (2014) that measures should be critical and should meet customer requirements.

From the collected evidences, it can be deduced that all improvement projects mapped *the existing process*, and identified end-to-end process activities to identify operational problems. Team leaders confirmed that these process maps were validated by having a *process walk-through and capturing* additional details from the *operational employee*.

Empirical evidences suggested that process measures were defined and included: 1) cycle time, 2) work in process (WIP), 3) rework (error rate), and 4) classification of non-value added activities. The Table 5.10 lists these measures that were used in the improvement projects together with a standard approach.

Table 5.10: Measures and common approach

Criteria	Key measures			
	Cycle time	**Work in process (WIP)**	**Rework/error rate**	**Non-value added**
Improvement projects	PA1, PA2, PA3 PB1, PB2, PC1,PC2,PC3,PC4	PA1, PA2 PB2, PC1, PC2, PC4	PA1, PA2 PB2 PC1, PC2, PC4	PA1, PA2 PB1, PB2 PC2, PC3
Approach	Process Mapping → Walk-through Process → Employee interview → Brainstorming			

Evidences shows that after defining measures, data analysis was the next step. It was noted by the author that less importance was shown for human factors which is in line with the study carried out by Hensley and Dobie, (2005) that focused on the variation in a measurement system that was used in services. Their findings suggested that the service sector should gather qualitative data such as employee and customer perceptions, and these should be supported with statistical information.

5.4.2.3 Analyse

The evidence shows that this step started with process mapping as the first activity, similar to departments A and C. It was observed that this approach was a constructive and has helped to visualise the end-to-end process. The application of this technique has highlighted the critical areas for improvement that was supported by data as evidences.

It was observed that in this step, several tools and techniques were deployed. The *data analysis techniques which were* applied such as hypothesis testing, the *value*

stream mapping at departments B and C. At department B, the NPS score was referred for *cause and effect analysis*. The table 5.11 presents the tools and techniques that were used throughout the analysis.

Table 5.11: Analysis tools and techniques with common approach

| Criteria | Tools and techniques in analyse-step | | | |
	Cause and effect	NPS	Value stream mapping	Data analysis
Improvement projects	PA1, PA2, PB1, PC1, PC2, PC3	PB1, PB2	PA2 PC2, PC3, PC4	PA1, PA2, PA3 PB1, PB2, PC1,PC2, PC3,PC4
Approach				

The empirical evidences pinpoints that the improvement team brainstormed with the business owner and identified the root causes of the problem. To this point, a statement quoted by CA1 *"a good collaboration between stakeholders provided a balanced perspective of the process and of the business"* needs to be considered. This is in line with the recommendation made by Mohamed, (2010) and Grima *et al.* (2014) who stressed that improvement solutions should be agreed by improvement team and stakeholders. Mohamed, (2010) observed that three criteria are generally used for selecting an option; 1) improved process effectiveness, 2) cost and benefit, and 3) impact on customer.

The Table 5.12 lists four types of improvement solutions, collected through empirical evidences.

Table 5.12: Four types of improvement solutions

Improvement solution	Improvement projects
Quick fix solution	PA1, PA2, PA3 ,PB1, PB2 ,PC1,PC2, PC3, PC4
Process reengineering	PA2,PB2, PC3
Process redesign	PA1, PA3, PB1, PC1, PC2, PC4
The development of supporting IT system	PA1, PA3, PB1 PC1, PC2, PC3

5.4.2.4 Improve

From the empirical findings, it is evident that not all improvements projects measured their results. Review of the literature highlights that this is important and therefore it should be included as a research question. To understand this further, the two-dimensional matrix to group all cases can be used. In the Figure 5.2, the *internal impact* referred as an outcome from employees' perspective on internal operations, whilst the *external impact* referred to the effect on the service encounter from the customers' perspective. With the help of experts and team managers of all three departments, all projects were clustered as shown in the Figure 5.2. This point will be further discussed in the section 5.4.3.
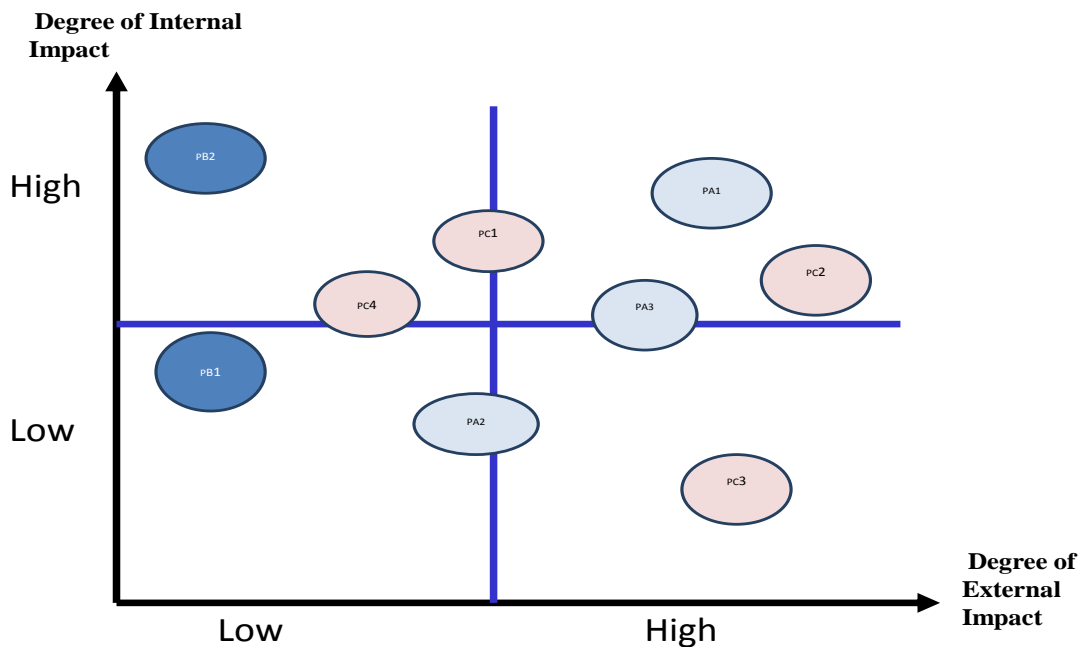
Figure 5.2: Lean project impact characteristic

5.4.2.5 Control

This Control step ensures that the improved process is embedded and supporting systems and structures are in place (Nave, 2002, Mohamed, 2010 and Grima *et al.* 2014).

It has been observed that the central objective of this final step was the same for all three department's cases. It appears that this step consists of two activities; transferring systems and structures and gathering summarised details on the improvements results as depicted in Figure 5.3.
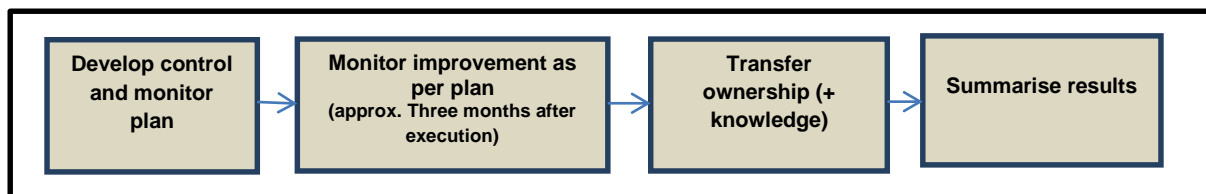
Figure 5.3: Control step - common approach

Overall the improvement team was responsible for establishing systems and structures. Empirical evidences indicated that several techniques were deployed, including control data charts, dashboards/process scorecard. At department C, a control board technique was applied to monitor and track problematic issues in the operations process. It is noted that the improvement team monitored the improved process for three months, and then transferred the ownerships to the business owners. It became an apparent that the business owner played an important role in maintaining the control charts and monitored on an ongoing basis. This is in line with suggestion made by Schroeder *et al.* (2008).

The second point noted that the improvement team summarised the results of the improvement project and communicated to the top level management. It was noted from the archived reports that the management update included a summary of changes and cost and benefits of the introduced change. When queried with team leaders for the rationale behind this summary, they confirmed that cost-benefits were quantified in financial terms and presented to the management team. It was found that there are limited evidences of measuring the improvement results towards

customer and employee satisfaction. When enquired why this is the case, information was shared that no measurement framework is in place that can be used to evaluate satisfaction element in the case study company.

To summarise, the key empirical findings revealed that improvement project results were not effectively being measured. This finding suggests that it may cause problems to sustain the improvements and continuously improve them since it is not being measured effectively from both internal and external customer's viewpoints. Consequently this may hinder Lean adoption in other departments of the case organisation. This finding is in line with Mohamed, (2010) who made a similar reflection through his empirical findings.

5.4.3 Evaluation

In this step, the three main criterias (internal quality, employee perceptions and cost) were in use as seen from the empirical evidences. The first criterion was that the 'internal quality' focusing on measuring the Lean project results from two aspects: the *operational dimension* and the *employee dimension*. The operational dimension measured operational process and contained metrics such as: 1) cycle time reduction (as noted in PA1, PA2, PA3, PB1, PB2, PC1,PC2, PC3,PC4); 2) WIP reduction (as noted in PA1, PA2, PB2, PC1, PC2, PC4); 3) Rework/error reduction (as noted in PA1, PA2, PB2, PC1, PC2, PC4); and 4) non-value added and waste elimination (as noted in PA1, PA2, PB1, PB2, PC2,PC3). These results were quantified into financial terms and compared with results taken from before and after the introduction of improvements.

The second criterion justified Lean improvement results was taking into account the employees' perceptions, that included: 1) work environment (as noted in PA1, PA2, PA3, PB1, PB2, PC1, PC2, PC3, PC4); 2) attitudes towards changes (as noted in PA2, PA3, PB1, PB3, PC1, PC4); 3) communication (as noted in PA1, PA2, PC3, PC4); 4) enhanced skill (as noted in PA2, PA3, PB2, PC1, PC4); 5) leadership vision and guidance (as noted in PA1, PA2, PA3, PB1, PB2, PC1, PC2, PC3, PC4); 6) productivity (as noted in PA1, PA2, PA3, PB1, PC1, PC4) and 7) process

standardisation (as noted in PA1, PA2, PB1, PC1, PC2). To assess results, a survey to record employee satisfaction and interview were used in all of the cases.

The collected empirical evidences pointed that measuring results of improvements adds to the understanding so that an appropriate improvement solutions is delivered and it is accepted by employees.

Empirical evidence confirmed that PA1, PA3, PC2, and PC3 were measured from the customer's perspective and highlighted that Lean outcomes helped improve the service quality. However, it was observed that evaluating results from the customer perspective was not favoured and therefore not included in the main cost–benefits results. To measure a specifically-designed survey and satisfaction survey were used. Two aspects were highlighted; 'what' improvement is realised by customers (e.g. improvement in speed, accurate information, more flexibilities) and 'how' these improvements are perceived by customers. These aspects could be added since it reflects what and how customer views service quality improvements.

The final criterion was the *cost dimension. From the evidences it can be deduced that* this dimension was considered most important. Empirical evidence demonstrated that Lean results related to improvement in internal operations and customer dimensions could be converted into a cost savings ('hard' - direct cost saving and 'soft' indirect cost saving). The higher customer satisfaction is linked long-term profitability through repeat business and or recommendations. On the other hand, the higher employee satisfaction leads with acceptance of improvement changes and future support for making improvements, thus creating culture of continuous improvement.

In summary, the criteria to measure the Lean results were identified from the cases. From the empirical data, the dimension, aspect and measures are collected and summarised in the following Table 5.13.

Table 5.13: Measurement summary

Dimension	Aspect	Key measures	Improvement projects
Engagement Value (Internal Quality)	Operational dimension - operations process	☐ Cycle time ☐ Work in process (WIP) ☐ Rework/ error ☐ Non-value added/wastage	☐ PA1, PA2, PB1, PB2, PC1, PC2, PC3, PC4 ☐ PA1, PA2, PB2, PC1, PC2, PC4 ☐ PA1, PA2, PB2, PC1, PC2, PC4 ☐ PA1, PA2, PB1, PB2, PC2,PC3
	Employee dimension	☐ Leadership ☐ Attitudes towards change ☐ Communication ☐ Skill development/ training ☐ Work environment ☐ Process process- standardisation ☐ Productivity	☐ PA1,PA2,PA3,PB1,PB2,PC1, PC2,PC3,PC4 ☐ PA2, PA3, PB1, PB3, PC1, PC4 ☐ PA1, PA2, PC13, PC4 ☐ PA2, PA3, PB2, PC1, PC4 ☐ PA1,PA2,PA3,PB1,PB2,PC1, PC2,PC3,PC4 ☐ PA1,PA2,PA3,PB1,PB2,PC1, PC2,PC3,PC4 ☐ PA1,PA2,PB1,PC1,PC2
Customer	'What' customers perceives– technical quality	☐ Accuracy ☐ Speed ☐ Flexibility	☐ PA1,PC2,PC3,PC4 ☐ PA1,PA3,PB1,PC2,PC3 ☐ PA1,PA2,PA3,PC1,PC2,PC3
	'How' customers perceives - functional quality	☐ Reliability ☐ Responsiveness ☐ Assurance ☐ Empathy ☐ tangibles	The analysis of archives, customer survey, and face to face conversations. The measures were similar to SERVQUAL dimensions.
Cost	'Hard' savings (profit)	☐ Elimination of non-value added activities ☐ Reduction of WIP/wastage (direct cost saving) ☐ Reduction of cycle time (resource utilisation saving)	☐ PA1, PA2, PB1, PB2, PC2,PC3 ☐ PA1, PA2, PB2, PC1, PC2, PC4 ☐ PA1,PA2,PB1,PB2,PC1,PC2, PC3,PC4
	'Soft' savings (profit)	☐ Higher customer satisfaction ☐ Enhanced service ☐ Increase customer loyalty	☐ PA1,PA2,PA3,PB1,PB2,PC1, PC2,PC3,PC4 PA1,PA2,PA3,PB1,PB2,PC2,PC3 ☐ PA1,PA3,PC1, PC3

5.5 Summary

This chapter carried out within-case analysis and presented results for all three departments' projects in section 5.3. The empirical evidences helped to generalise the key findings which is recorded in section 5.4. This also addressed the fourth research objective together with details to answer the research question as recorded in the section 1.4.

Three stages were defined to explain how these three departments conducted Lean projects. These consisted of: Initiation (1-Define, 2-Measure, 3-Analyse), Implementation (4-Implement) and Control (5-Control). To summarise, a conceptual diagram is drawn in Figure 5.4 below.
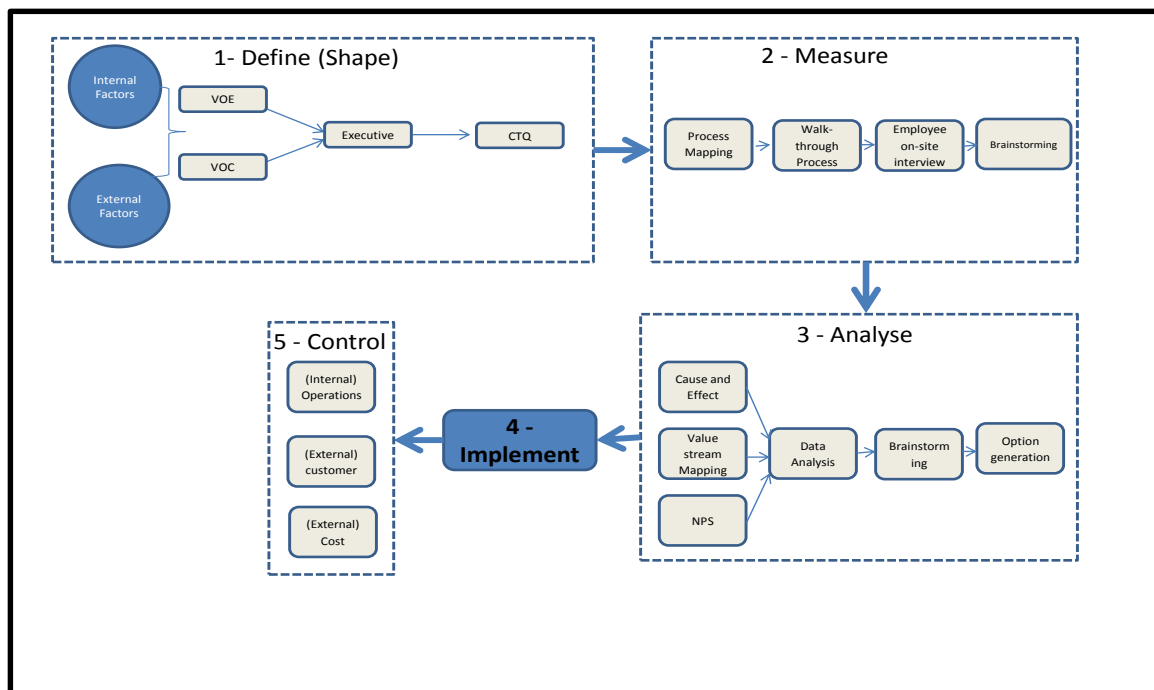
Figure 5.4: Three stages for Lean projects

In addition, the key empirical findings suggested some critical ideas that would be worth pursuing. These are summarised as follows:

• The Lean improvement focus was on cost reduction (savings) and operations process efficiency

• Lean results were measured from the customer perspective, but omitted to consider the employee perspective. These were found ineffective and had the following shortcomings:

> i. Soft aspects were given less attention from the customers' perception (e.g. responsiveness, reliability, assurance) and employees' perception (e.g. leadership, work environment, process-standardisation, skills development) resulting from the Lean project.

> ii. There was no specific measurement mechanism for measuring the results of Lean improvements

In essence, in-depth case study analysis identified important service quality elements and explained the results of Lean improvements.

In the next chapter, the conceptual framework (Figure 3.2) with the important elements identified above will be discussed in more details with Lean experts. This will help to refine and validate the conceptual framework.

CHAPTER 6 : DATA ANALYSIS

This chapter explains and discusses how the proposed conceptual framework (Figure 3.2) was validated with the help of key experts within the airline company. Consequently, the research threads recorded in the chapter 3 section 3.1 are revisited and evaluated considering experts' comments and suggestions and empirical data. Thus, this chapter's focus is on refining the theory and concepts, verifying the theory and relationships and will address the fourth and the fifth research objectives. The chapter concludes with revisiting the proposed framework, which exposes the interaction between Lean improvement initiatives and service quality. Revisiting the framework, comparing it with the literature on performance measurement frameworks, and considering practitioner's views on the importance of evaluating the Lean results with the expression of its need, a prototype tool is constructed.

6.1 Expert interviews

In total, ten Lean experts from the organisation under study were selected, based on their years of experience as well as their vast knowledge of the subject areas, and coded as displayed in Table 6.1.

Table 6.1: Summary of key experts' reference code

Ref code	Experience (no of years) and Additional information	
	Lean experience	Information
E1	4	Experience of TQM and Six Sigma
E2	3	Practiced TQM and Six-Sigma in the Transport and Logistics industry
E3	2	Currently working in the area of Operational Research and simulation. Know-how of BPR, TQM and Six-Sigma, have participated in Lean improvements
E4	4	Lean and TQM experience and have knowledge of change management – trained on the Change Acceleration Programme
E5	4	Currently involve in organisational design and development but have extensive knowledge of recent Business Improvement Methodologies and Service Quality principles
E6	5+	Currently involve on various Lean initiatives and has expertise in Lean diagnostic
E7	5+	Involved in Lean initiatives and experience of CRM
E8	5+	Lean Manufacturing experience and tools expertise
E9	5+	Experience of structure and standards of quality improvements, Service quality principles
E10	4+	Currently involved in Enterprise Architecture, but has knowledge of Service Quality principles

At the beginning of the interview session, it was explained that the research objective and thoughts behind the framework as shown in figure 3.2. 25 questions were prepared in advance and some were added after the first interview in order to obtain more meaningful information. If any clarification was required after the session, follow-up questions were asked via telephone (see Appendix B 1.4). The interviews lasted approximately an hour and on occasion were spread over two sessions.

Miles and Huberman, (1994) and Orosz, Miles and Huberman, (1997) suggested that to increase the validity of the data, replicated ideas should be regarded significant. Similarly, Nieto and Perez, (2000) stated that replicated ideas increases data validity.

To follow on these suggestions to refine the theory and validating the relationships, experts' comments and suggestions were gathered and recorded, which are documented in the subsequent sections. The interview notes were transcribed and

referred for clarifying discussed points, highlighted key messages and summarised in Table 6.2.

Table 6.2: Experts' comments and suggestions

Topics	Experts' views	Next steps	Outcome
1) Define different perspectives of Lean (from Customer and Process viewpoints + Employee and Process viewpoints; include approach taken for improvement initiatives)	Lean's customer-focused approach requires further understanding in services. Employee involvement is of course fundamental to the success of Lean initiative: "*without the close involvement of those who are involved in the process, it would be futile to try to identify opportunities for improvement for their process, let alone try to implement them*" (SML1, E1).	Obtain clarity on process and customer views. Understand how Lean initiative result can support customer satisfaction. Similarly, clarify the concept of the employees' perspectives. Understand how Lean initiative result can support employee engagement.	Two dimensions - external quality and cost importance was highlighted for understanding the Lean initiative results towards customer satisfaction. Two dimensions – operations employee and operations process aspects as an internal quality were equally important for understanding the Lean initiative results towards employee satisfaction
2) Identify theory concepts	The two concepts on internal and external quality requires further development. For refinement, empirical evidences can be used (E2, E5).	Suggestion was to provide a broader view of improvement in quality resulting from adopting Lean principles & enhance the understandings of internal and external quality.	A number of iterations between empirical evidence and literature helped to refine the theory concepts. The results refined the framework.
3) Define relationship of theory concepts	The relationship between these concepts require more clarity and understanding: "*it is important to understand the logical relationship between internal and external quality dimensions*" (E5).	Validate relationships between quality dimensions from both internal as well as external.	These relationships were validated through learning about organisation structure of the airline company. A plan created to verify these relationships.
4) Highlight underlying theme	It is important to understand the intermediary: "this *explains the links between direct outcomes of Lean initiative and customer –employee satisfaction*" (E1, E6).	Lean principle is about focusing on customer needs, therefore important to include value concept. An idea of forming a working group was suggested to understand the value concept relevant to the case study company.	The customer-employee concepts were included to clarify and enhance the framework. The value of Lean initiative for external quality and cost dimensions were considered which is perceived by customers. For internal quality dimensions the engagement value included employee views.

6.2 Refinement of theory

For this research the aim is to refine and sharpen the theory concepts. Therefore this section gathers ten experts' comments and suggestions on the developed framework (see section 3.6.1, figure 3.2). Two questions were put forward to the experts at this stage:

> *(1) What are the appropriate definitions of the theory concepts towards theoretical and practical implications?*
>
> *(2) What are the important concepts that should be included in the proposed framework?*

As a result, sections 6.2.1 and 6.2.2 summarise the experts' comments relating to the different perspectives of customer and employee. Section 6.2.3 describes the development of a conceptual division. The theory concepts will be developed. Evidences gathered so far will be added incorporating experts' suggestions in section 6.2.4.

6.2.1 The 'customer' perspective

The 'customer' perspective is critical for us to understand when adopting the customer centric philosophy of Lean. The experts described how Lean has been adopted in the company. They commented that for service improvements, the management team have recognised that the company needs to focus on customer needs, and that has become a key driver for Lean adoption (E6, E7, E9, and E10). To provide a background information on Lean adoption, the Lean CI team manager commented:

> *"The customer-focused approach of Lean has become imperative for improving the business process, particularly in a service organisation such as ours. This approach has considered the customer at the heart of the operation and therefore the centre of the Lean initiative, which is slightly different from the other business improvement approaches our organisation has adopted in the past"* (E6).

This was supported with a statement made by two other experts:

> *"Lean adoption within our organisation is aimed not only at improving the operational processes, but also at enhancing customer satisfaction"* (E7, E10).

A discussion of the difference between operational process and customer perspectives that were recorded in the project documentation. A discussion was held with referencing the Lean service literature that pointed out that the customer perspectives should include both 'what' and 'How' – meaning what customers required from the service, and how a service was delivered. In that discussions, a consultant explained:

> *"Service delivery often fails due to the unresolved tensions found between the conflicting perspectives of the customer, the process, and the employee. Therefore, successful service delivery requires the integration of all of these different perspectives. Service delivery is the integrative actions a company takes to establish customer and employee satisfaction and loyalty and process improvement in order to improve service quality for this purpose"* (E4).

The empirical evidence illustrated two key process and their measures from a customer's point of view, as shown in Table 6.3.

Table 6.3: Process and customer perspectives measures

Dimension	Time	Cost	Quality
Operational process perspective	Processing time	Cost	Defect in the process
Customer perspective	Speed/responsiveness	Price	Accuracy

As pointed out in the literature that customers cannot directly perceive that better service quality resulted from the specific Lean initiatives (E1, E2, E4, and E8). This view is similar to the empirical evidence recorded in chapter Four section 4.2.2.2 to 4.2.2.5, that relayed that Lean results are measured explicitly for example reduction in the cycle time, removing non-value added activities in the airline company. It was noted that the customer dimension was under-measured in practice. This supports the comments made by Jones and Kober, (2010) who claimed that in literature, the outcomes of Lean initiatives from the customer dimension are difficult to locate.

However, review of literature suggests that it is important to assess the Lean results from a customer perspective, this point was agreed by both senior manager and counsultant (external to the company).

E7 stated that:

"Without the assessment of Lean outcomes from the customer's perspective, a department or organisation cannot justify that the improved process is better or not. The customer perspective measures should be used not only to confirm the success of Lean initiatives, but also to help in sustaining the improvement direction within the organisation" (E7).

E8 mentioned:

"It is important to appraise the Lean initiatives by investigating through the end customers, rather than taking a narrow view point of evaluating from the internal operations process perspective" (E8).

6.2.2 The 'employee' perspective

Understanding the 'employee' perspective was also considered to be critical in the airline company. The experts (E5, E7 and E9) described how Lean initiatives were started in the departments to improve their business processes and commented that in order to improve the services that they offered to their customer, they would also have to pay attention to their stakeholders' expectations, and that one of the most important stakeholder groups is the people who are executing the processes. We need to consider the scale and scope of an initiative, what is in scope? Who should be involved? And what results might be expected and by when? It is evident from the case study documentation that some cases focused on small-scale, incremental, short-term process improvements initiatives that delivered quick results. For example, change into the administrative process, IT application planning process, these changes had high volume but low in implementation complexity therefore resulted in some quick improvement changes. However, a number of respondents recorded on survey forms that the long-term nature of some implementation plans that had been going on for a number of months and were still met with resistance and resulted in lack or loss of interest from their part. This viewpoint is in-line with Wilches-Alzate, (2009) who stated that internal change involves operational people

over longer time scales, and this can be problematic as it will result in disengagement and loses the momentum of the change. He stressed that this could result in people becoming cynical about 'Lean as the latest fad'. The same point was reiterated by a senior manager who stated that:

> *"An 18-month programme with minimal operational people involvement is doomed to fail…"* (SA1).

Lavigna, (2011) noted that there are benefits of an engaged workforce which can be listed as improvement in productivity, product or service delivery improvements, improved customer care, enhanced collaboration within team members, reduced absenteeism and disputes, and increased morale due to the growth in skills and knowledge of all employees. Gallup, as cited by Dernovsek, (2008) claims that employee engagement is linked to employee attachment and commitment. Employee engagement as defined by the Chartered Institute for Professional Development (CIPD) as a combination of commitment to the company and its values plus a willingness to help out colleagues. It is claimed that engagement is discretionary; it cannot be 'required' by an employer (CIPD, 2009).

The expert who also has knowledge in the field of Organisational Design and Development commented that:

> *"Organisations have realised it's more than just how satisfied employees are in the workplace. Engagement is this notion of people coming in to work and [being] aligned with the purpose of that organisation. If they are engaged, they are therefore going to work that 10 % harder"* (E5).

Salanova, Agut and Peiró, (2005) argued that engaging the employee is key for success in implementation because it fosters commitment and improves the performance.

Discussion with the senior manager on this topic, commented that;

> *"A fully engaged workforce better positions us to win in our service industry by delivering superior business service, which ultimately translates to creating maximum shareholder value. We should also*

consider if we don't engage them as well, that can result in turnover and morale problems and it may sabotage the effectiveness of Lean implementations. Although employee engagement is a complex concept, it is influenced by many 'hard' and 'soft' factors such as workplace culture, organisational communication and managerial styles of trust and respect, communication. For today's different generations, access to training and career opportunities and empowerment to make decisions are important too. Thus, to foster a culture of continuous improvement and engagement, we need to evaluate Lean improvement initiatives, taking into account internal and external customers of the change. From our experience in this company, often 'softer' elements that contributes to employee engagement and thus satisfaction are prioritised below easy-measure, focusing only on the bottom line improvements" (E9).

To explore further empirical evidences were used to illustrate the process measures which can be different from employees' perspective, as shown in Table 6.4.

Table 6.4: Key measurement from process and 'employee' perspectives

Dimension	Time	Cost	Quality
Operational process perspective	Processing time	Cost	Defect in the process
Employee perspective	Training for the new process and system	% revenues from new customers	First time acceptance

The review of literature highlighted the fact that when employee dimensions are considered, communication, skills and training, the team environment are measured informally and are inconsistent. To support this view, E (6) commented that in this company, these dimensions are measured through internal survey or discussion at the project completion meeting.

In summary, it was confirmed that it is important to assess Lean results and for that it should consider the three perspectives: process, customer and employee. This findings supports Harris and Harrington, (2000) and Konrad (2006) viewpoints in the literature. They argued that companies should understand the operations process performance as well as the service quality as perceived by both customers.

The discussions in sections 6.2.1 and 6.2.2 and different perspectives that have been highlighted has created a foundation to the proposed framework (Figure 3.2). The theory definitions will be discussed next to further develop critical ideas.

6.2.3 The discussions on quality' dimensions

From the discussions above the difference between customer and employee perspectives has highlighted the underlying implications of all four dimensions; operational and employee (internal) and quality and cost (external) as depicted in the framework (Figure 3.2).

To validate this, some experts provided a suggestion to refine and sharpen both definitions and terms. This supports an idea presented by Orosz, Miles and Huberman, (1997) and Nieto and Perez, (2000) who recommended that definitions and terms should be sharpened to establish more concrete theory ideas. From the expert interviews, various terms were underlined to represent both of these dimensions (internal-external). With more discussions with academic researchers and Lean CI manager commented that:

E6 stated:

> *"From the proposed framework, the internal operational dimension is closely related to the efficiency of the operational process which can be measured objectively, whereas the customer and employee dimensions are considered as the subjective measure of the effectiveness of a Lean initiative and these are not so easy to measure"* (E6).

An Academic expert added:

> *"In the Service Sector, the outcomes of the Lean initiative can be perceived as explicit quality, e.g. speed and accuracy of service, and implicit quality such as responsiveness and reliability during the service delivery process. It is imperative to understand the difference between these two perspectives"* (E1).

To understand this point further, a discussions with an external expert (consultant) who commented that:

> *"From my experience, the outcomes of the business improvement initiative using TQM, Six Sigma or Lean in the Service Sector can be measured towards both tangible and intangible dimensions, which I have found are closely related to internal operational and customer dimensions as proposed in the framework"* (E2).

It was discovered that in the analysis stage separate results were delivered related to different quality dimensions. Experts recommended naming them as: 'internal quality' and 'external quality'. These terms were discussed further to describe them by considering experts' comments as follows:

> *"The internal quality dimension represents an explicit measure of Lean initiative outcomes pertaining to the objective criteria. The key measures of the internal quality dimension are used to validate the tangible outcomes of Lean, these are closely related to the perception of the service quality ('what' it is perceived), e.g. speed, accuracy. This can be directly measured internally through processing time, non-value added elimination, work in process, defect reduction, staff's performance and productivity improvement."* (E1, E3).

To further explain, both E1 and E3 elaborated by saying that, on the other hand:

> *"The external quality dimension represents an implicit measure of Lean initiative outcomes, which are used to understand 'how' the customer perceives the service quality, pertaining to the subjective criteria. The key measures of external quality dimension are used to justify the intangible outcomes of Lean. This can be indirectly assessed externally such as responsiveness, accuracy, and reliability of service."* (E1, E3).

In summary, 'internal quality dimension' and 'external quality dimension' terms were initially proposed and were incorporated into the proposed conceptual framework (Figure 3.2). The next section defines these terms through analysing empirical evidence and reading through relevant academic literature.

6.2.4 Definitions of quality dimensions (internal-external)

In this section the internal and external quality dimension definitions are refined through quality management literature. For this, a broader view was taken for defining 'quality' and then justified the rationale in the context of the proposed framework (Figure 3.2). With literature, experts' comments were cross-referenced to add both the theoretical and practical views.

6.2.4.1 The quality dimensions

In literature a number of scholars defined 'quality' as a conformance to specifications (Levitt, 1972, Bouranta, Chitiris and Paravantis, 2009), fitness for purpose (Juran

and Bingham, 1974, Anderson *et al.,* 1994) and meeting or exceeding customers' expectations (Grönroos, 1984; Parasuraman *et al.*, 1985, and Reeves and Bednar, 1994).

Parasuraman *et al.* (1988) observed that the service quality has gradually dominated. However, they argued that there is a need to define quality from the customer`s point of view. Reeves and Bednar, (1994) explained that quality measures should not be based mainly on production. They suggested that in recording customer requirements, measures should be an important part in defining quality and it should be recorded. They emphasised that this helps an organisation to acknowledge the service value they deliver to their customers.

It was noted that within the literature quality definition and service quality appears to be consistent. It has two distinct dimensions, internal and external. At this point, Juran's, (1974) definition of quality was used as an example which states as 'fitness for purpose' and it includes views of both the internal and external quality features.

Similarly, in the SPC, Heskett *et al.* (1994) argued that quality has internal and external dimensions. They claimed that these both are required for service quality to be delivered for satisfying the end customers. This in turns improves long-term profitability (Heskett *et al.,* 1994).

Bowen and Ford, (2002) pointed out that in order to manage service operations, key measures (referred as the efficiency and effectiveness) should be understood, and derived from both production of the service. This point of view is similar to Reeves and Bednar (1994), who explained 'quality' as a 'value offered to customers'. They emphasised that high quality products and services can be delivered to customers, but for that organisations should focus on internal efficiency and external effectiveness, and reflect cost implication to maintain conformance (Reeves and Bednar, 1994).

The concepts of internal and external quality are in line with Detert and Schroeder, (2000) who suggested that internal and external elements should have a balanced

focus. The internal and external quality dimensions theory found in the literature is summarised in Appendix A 1.3.

This section highlighted that it is important to understand the results of Lean improvements considering both internal and external quality dimensions. Therefore, clarity in these definitions is required and should be cross referenced with the proposed framework (Figure 3.2). This is considered in the following sections.

6.2.4.2 The internal quality dimension

The internal quality dimension is referred to as efficiency in the literature and its focus is on performance of operational process by Rao *et al.* (1999). The empirical evidence collected points to the fact that the Lean initiatives results are measured explicitly using measures such as reduced cycle time and eliminating waste. This findings were confirmed by experts who commented that at the beginning of Lean adoption into their company the focus was on improving the internal processes, for example back-office operations (E7, and E10). These comments are in line with Rao *et al.* (1999), Yasin and Alavi, (2007) from the literature who observed the Lean adoption and adaptation in the services and claimed that a positive relationship exists between improvement initiatives and operational efficiency.

The experts pointed out that a number of Lean initiatives within the airline company focused on improving the operations from employees' aspects. These were focused to enhance the work environment, productivity, and skills development. They confirmed that this has been a positive influence since it impacted on both improving operational process efficiency and the service delivery (E2, E4, E6, E7, and E10). This finding is the same as the claims made by a number of scholars who recommended considering internal measures to improve operational processes (Anderson *et al,* 1994, Jammernegg and Reiner, 1997, Zairi, 2000 and Howcroft, Hamilton, and Hewer, 2007).

Heskett *et al.* (1994) argued that for services, the employee is involved in delivering high service quality that leads to an improvement in customer satisfaction. Ghobadian *et al.* (1994), and Vellin and Concelman, (2005) agreed and added that

employee engagement is important since it drives the success of both technical and functional quality.

Discussing the internal service quality topic with one of the consultants, it was pointed out that an airline company with a positive and enabling work environment gives employees a sense of belonging and encourages them to take ownership. They explained that a positive and enabling work environment leads to job satisfaction, reduces resistance to change, and encourages discretionary behaviours that are often not recognised by a formal reward system (E8). The term 'discretionary behaviours' was explored in the literature and found explanation in CIPD article that explained that the term 'discretionary behaviours' is linked to leaders who actively demonstrate the organisation's values from a place of integrity (CIDP, 2009).

On the subject of work environment in the literature, Quinn, (2004) observed that there are polarities in organisational life and argued that it is leader's role to create balance and to ensure not putting importance on 'tasks' and 'processes' over people. He stressed that leaders need to have a true appreciation of the impact that their decisions have on their workforce. They need to create an open and fair work environment for employees (Quinn, 2004, p.160).

Hamzah and Zairi, (1996) pointed out that when there is a sense of belonging amongst employees, it can be often be correlated to a strong psychological attachment with the organisation and adds to their motivation. They together with West, (2005) added that this then results in motivated employees making a meaningful contribution to the organisation and therefore it becomes a contributing factor for differentiating between the most profitable and the least profitable organisations. When employers deliver on their commitments (when their actions fulfil employees' expectations), this should be reinforced by the employees' sense of fair play and trust in the organisation and should help to generate a positive 'psychological contract' an unwritten mutual obligation between the employer and the employee (Hamzah and Zairi, 1996).

To summarise, internal quality dimension considers operational and employee as two imperative aspects. This has been supported through the reference to related literature, empirical findings and experts' suggestions. It should be noted an employee aspect supports the foundation of the internal quality dimension and this point has not been explored in the service literature in any extent.

6.2.4.3 The external quality dimension

This externally focused dimension measures Lean results from the customers' perception and are considered important.

To explore this topic further, the service quality literature was referenced and SERVQUAL and Grönroos' as two main service quality frameworks that has been covered in the Chapter 2 were considered. In the literature, SERVQUAL has been criticised by Grönroos, (1994) and at a later date by Kang, (2006) because SERVQUAL primary focus is on the service delivery process and not on evaluating the improvement outcomes/results. It was then decided to add on Grönroos' service quality framework to understand the factors that affect evaluating the results of improvements.

Empirical evidence from the departments suggests that airline services is viewed in two components; a 'flying product' (e.g. meal, entertainment in the air) and a 'flying service' (on board services, check-in services). These are simultaneously delivered to customers and considered as elements of service quality (LC2, LC5, LA2, and LA3). To explain this concept, the experts E1, E4, E6, E8 and E10 provided the example of the premium passenger who likes to be recognised on board at the point of service failure. The premium passenger is expected to receive a proactive response to service failure, and reviews as an element to service quality delivery and could act as an important criteria for reselection or recommendation of airline services. The experts were in agreement to evaluate the Lean initiative's results and they stressed that both technical and functional quality aspects should be included (E1, E8 and E10).

This suggests a need to evaluate Lean initiative results measuring the technical and functional quality aspects of service quality. In the literature, this view has been supported by Harvey, (1998), and Kang, (2006). At this point, service quality literature was revisited to understand the definition of service quality in greater details.

Grönroos, (1984) defined the technical quality and the functional quality as using 'What' and 'How' questions - 'what' customers received from the service interaction, and 'how' customers received. Howcroft, Hamilton and Hewer, (2007), and also older scholars such as Lehtinen and Lehtinen, (1991), and Harvey, (1998) confirmed that it is challenging for a service provider to deliver customers with (technical) services, at the same time managing their customer's perception.

There is a debate about certain elements of the technical or functional quality dimensions and where best to place it. For example; Maddern *et al.* (2007) argued that 'reliability' is not aligned with the functional quality concept as outlined by Grönroos. It is argured that reliability should be positioned in the functional dimension since it is linked with how the customer would perceive the service quality during its delivery. To consider 'reliability' in airline services, communications in the customer relationship is most important at the time of service failures since the majority of customer interaction occurs here. For example, of the application for a ticket refund or complaints. Hence, reliability relates to the customer's perception of services rather than as a measure of technical quality (e.g. flight product). It is believed that this classification is significant for improving service quality.

A number of scholars in the literature have combined both the technical and functional quality aspects into the external quality dimension (Powpaka, 1996, Harris and Harrington, 2000, and Dabholkar and Overby, 2005). The framework (Figure 3.2) was revisited and marked that the external quality should be a predecessor of customer satisfaction components. The two terms were added 'Internal Quality' and 'External Quality' to the framework to add more clarity to the framework.

In summary, technical and functional quality terms and definitions used in the service literature are not consistent but have similar implications. In this instance the

Grönroos' service quality framework view was adopted as it appeared best suited to evaluate the service quality improvement results. In order to avoid confusion with the service quality principles 'technical features' and 'functional features' terms were used instead of technical and functional quality terms.

6.3 Verification of theory

The experts within the airline company suggested to verify the logical relationships and compare them with the empirical evidences. Hence, the following section contains a summary of the experts' views and justifies the logical links of the framework.

6.3.1 Logical relationship between internal and external dimension

For this, two experts were involved to discuss the significance of the logical links between internal and external quality dimensions. Both experts (E1 and E4) commented that external quality dimension is driven by internal quality.

An external expert (counsultant E4) said:

> *"Since the main objective of the improvement initiative is to improve the internal operations process, the internal quality dimension is explicitly considered as the main driver of external quality dimension. Consequently, the outcomes of the internal process improvement would help improve the external quality as perceived by the customer"* (E4).

This was then followed by another Lean external expert, E1 who stressed that:

> *"In our organisation, we adopted Lean primarily for improving the performance and efficiency of our back office business processes. This mainly aimed at improving the quality of our products and services for enhancing customer satisfaction"* (E1).

To back these viewpoints, a number of other experts expressed that in their organisation, Lean initiatives focuses on improving operations for employee and customers and improvement results shows improvement in service quality as perceived by customers (E2, E6, E7, and E10). They proclaimed that therefore internal quality improvement is a prerequisite to external quality improvement.

Experts pointed out that the external quality dimension explains how customers perceive service quality and it is related to subjective measures. E2 and E7 then added that this is why external quality is arbitrator (mediator) between operational process and the customer. A comment was made:

> *"As the proposed conceptual framework, I view the external quality dimension as the customer requirement that could be translated to the objective measures of the internal operations process. This would provide practitioners an understanding of the outcomes of the Lean initiative from both the customer and the process perspective, which could be further developed as the appraisal system of the Lean initiative"* (E2).

In summary, considering the expert's viewpoint, it was found that there exists a link between internal quality and external quality dimensions. The prerequisites as an alternative rational to understand the Lean initiative results were considered. However, these two dimensions relationship require further refinement and validation. This will be discussed in relation to the team structure of the airline departments, which is briefly outlined below.

6.3.2 The team structure

This section describes the three departments' team structure: ticketing, IT provision service, and customer focused selling. All of the teams that were studied had a common basic structure; separation of front-office and back-office operations. This is similar to the service factory concept of Johnston, (1999) and later observed by Goldhar and Berg, (2010). Both of these scholars suggested that this formation requires an appropriate structure for a service organisation. Experts agreed and commented that the main idea is make routine activities as a back-office function, and allow the front -office to focus on sales and customer service activities (LA2, LA3, and LC4). This view was supported by the IT provision team manager who shared his view that the routine processes can be managed as a production line. This view was agreed by another expert who exemplified:

> *"Since there are a huge number of applications request made each day, it is important to apply the manufacturing factory concepts to manage day-to-day operations....we consider IT requests fulfilment as*

the production line that produces the IT service to the front operations"
(EB4, E2).

Similarly, the promotional manager explained and was confirmed by another expert:

> *"The back-office operations processes become the same as the manufacturing factory, aiming to improve the speed, and quality for processing the transaction as the customers' (our agent's) request bid price for the market sector. Front-office tends to pay more attention to the sales and service function, rather those operational tasks that process bids acceptance and recording into systems and reporting functions"* (LC5, E3).

Hence, a number of scholars have noted that this decoupling strategy is widely adopted and as a result has increased efficiency in operations (Metters and Vargas, 2000 and Zomerdijk and Vries, 2007).

From the evidences, it was obvious that routine operations were grouped together as a central function. When explored, the senior manager explained that centralised function's focus is to improve process efficiency and reduce the operating cost. In support of this the manager and an expert commented that this way the front operations work more effectively and their focus is on deliver higher service quality to customers (LA2, E6).

The gathered evidences pointed that the improvement results in back-office operations were closely related to the internal quality dimension and impacted operations and employee because a standard operating procedure (SOP), standard reporting tools from a shared data warehouse were used. It was observed that these operations were team-based and monitored by a team leader who was responsible for the performance improvement of team members as well as their processes.

The front office are primarily concerned with the service delivery to customers. The senior manager and the customer service manager described the objective for front operations to deliver the best service quality and satisfy our customers (E7 and OA1). As discussed above, two important criteria (technical and functional) for service quality were referred in this context and concluded that the back-office and front-office structure is closely related to internal and external quality respectively.

Since the aim of this study is to understand the outcomes of the Lean initiative for improvements in service quality, the internal quality could be considered as a prerequisite of the external quality. In summary, the quality dimensions related to the team structure are shown in Table 6.5.

Table 6.5: The quality dimension and team structure

Team structure	Quality dimension	Key critical aspects
Back-office operations	Internal Quality	Internal operations process
		Internal operations employee/ staff
Front-office operations	External Quality	Technical features
		Functional features

6.4 Refinement of concepts

This section broadens the concepts of 'customer value' and 'engagement value' emerged as a central theme in the framework as shown figure 3.2 and links Lean initiatives with employee and customer satisfaction. The 'customer value' and the 'engagement value' concepts were surfaced through empirical evidences and the literature review. The importance of the 'customer value' concept will be clarified in section 6.4.1, and similarly the importance of the employee 'engagement value' concept will be clarified in section 6.4.2.

6.4.1 The 'customer value' concept

Woodruff, (1997) noted that organisations are using the 'customer value' concept to create and deliver superior value to their customers. Several scholars have also commented that there has been an increase in interest for this concept in both fields, i.e. in academia and practitioner practice and has also been studied in the marketing arena (Gale, 1994, Holbrook, 1994, Woodruff and Gardial, 1996, Rucci, Kirn and Quinn, 1998, Payne and Holt, 2001, Flint *et al.* 2002 and Spiteri, 2003). Hoseason,

(2003) and Patti, (2013) both claimed that 'customer value' is the most used conception that draws a relationship between quality and price.

The literature pinpoints a number of issues with the 'customer value' concept. The three most mentioned issues recorded by various scholars are: 'customer value' - unclear definition (Woodruff, 1997) customer perceived value challenges (Holbrook, 1994 and Zeithaml, 1988) and an undefined relationship between customers' value (perception) and customer satisfaction (Spiteri, 2003).

In the literature, there are various interpretations of what is meant by 'customer value'. Zeithaml, (1988) claims that the term may mean low price, receiving what is desired, receiving quality for what is paid, or receiving something in return for what is given. Hoseason, (2003) argued that customer value is the ratio between customer perceived sacrifices and benefits. Woodruff's, (1997) definition of 'customer value' is widely cited and encompasses most interpretations of customer value. Woodruff defines 'customer value' as:

> *"A customer perceived preference for and evaluation of those products attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations"* (Woodruff 1997, p.142).

The definition above suggests that there are two aspects to 'customer value': desired value and perceived value. Desired value refers to what customer's desire in a product or service. Perceived value is the benefit that a customer believes he or she received from a product after it was purchased. In principle, Zeithaml, (1988), Rust and Oliver (1994), Woodruff, (1997), Flint *et al.* (2002), and Hoseason, (2003) all agree that customer value is a trade-off.

Dumond, (2000) and Setijono and Dahlgaard, (2007) argued that the trade-off idea reflects the notion of 'what they got and what they paid'. A crucial question then arises of how a service organisation should deliver the value their customer seeks in order to gain their satisfaction?

From the review of service literature it was noted that a number of researchers have argued that service quality dimensions should be considered as prerequisites for gaining customer satisfaction (Churchill and Suprenant, 1982, Cronin and Taylor, 1992, Anderson and Sullivan, 1993, Rust and Oliver, 1994). Ravald and Grönroos (1996), Heskett *et al.*, (1994), and McDougall and Levesque (2000). Zeithaml (1988) have noticed that perceived value as a determinant of customer satisfaction was not included therefore regarded as a shortcoming. They argued that value from quality can be differed in two ways: 1) value is more personalised than quality; and 2) value requires a trade-off between 'give and get' thinking. Spiteri, (2003) suggested these two (service quality and customer value) are distinct components but do complement each other and both of these should be measured. A number of scholars have noted that customer value is an important element since it links the desired product or service attributes with anticipated results (Payne and Holt, 2001, Setijono and Dahlgaard, 2008).

In this research, it is believed that the 'customer value' concept provides all-inclusive thinking in which customers perceive the results of improvement. This concept incorporates the trade-off between technical features/functional features as benefits and cost/price as sacrifice. Hence, the 'customer value' concept was included in the framework to understand how the outcome of improvements enhances customer satisfaction. From the literature, it can be deduced that with an increase in the quality (benefits) and a reduction in price (sacrifice) the 'customer value' could be enhanced.

The collected evidences from the airline company points out that Lean improves the internal quality dimension, impacting on both dimensions (external) quality and cost. This creates a value for a customer and supported by the Lean's first principle of – specify value.

It is believed that the value concept extends the framework and links it with the operations process dimension which is shown as internal in the framework (Figure 3.2). As a result, the framework (Figure 3.2) was redrawn to include these links and

suggests a relationship with improvements with customer satisfaction. This can be seen in Figure 6.1.

From the gathered empirical evidences the author concluded that customers may not realise a better service quality as a result from the Lean improvements. This point was explored where several Lean experts expressed that it is difficult to link the outcomes of the Lean initiatives to the service quality as perceived by the customer. However, they all agreed that it is important to understand and evaluate Lean results from the customers' perspective to gauge their satisfaction (E2, E3, E4, E7, E8 and E10).

In order to understand how the improvement results are currently evaluated, the empirical evidences and expert comments were gathered. These evidences pointed that the customer satisfaction metrics used within airline departments did not consider a specific Lean initiative, but focused on the overall satisfaction with services (LA2, LA3, LC2, LC3, LC4, and LC5). Through discussion with a number of Lean champions who expressed an interest to have a standard method for evaluating improvement results at the project level that considers both customer and employee satisfaction elements (LA3, LC2, LC4, and LC5). They listed the requirements and were used in the section 6.7.2.

6.4.2 The 'engagement value' concept

Lavigna, (2011) defined 'employee engagement' as a heightened connection to work with the organisation mission and co-workers. He commented that it is not necessarily about happy employees, although it would be nice if employees were happy, at least most of the time. They stressed that engaged employees find personal meaning and pride in their work and they share the same values as their organisation. Another way to put it is that 'engaged employees plan to stay for what they give; the disengaged stay for what they get' (Lavigna, 2011).

Engaged employees defined by the Anitha, (2014) as follows:

- They go the extra mile for customers

- They work hard and smart
- They volunteer their best ideas
- They drive innovation to move the organisation forward

The literature review pointed out that all managers would want their employees to be highly engaged. Engagement matters because there is a strong research-based business case for improving employee engagement. For example, the BlesssingWhite research company conducted extensive research on engagement in 2011 of a public opinion polling firm. The firm's results demonstrated that high-engagement organisations outperform low-engagement organisations in seven critical areas - profitability, productivity, customer satisfaction, retention, absenteeism, safety, and lost or stolen inventory. According to this research, high-engagement organisations are almost 20% more productive than their low-engagement counterparts. Another study carried out by BlesssingWhite of 50 global companies concluded that organisations with high levels of employee engagement produce better results by 43% than organisations that suffered with low employee engagement. Within the literature 'engaged employees' is defined as those who work with passion and feel connected to their organisation, innovate to move organisation forward. The literature also defined an 'actively disengaged' term where *'employees are busy acting out their unhappiness and undermine accomplishments of their engaged co-workers'*.

Womack and Jones *et al.* (2003) claimed that the majority of Lean programs fail because of a weakness in the company's efforts to engage their people to continuously improve. This underpins the fifth principle of Lean, which is: *"**Perfection** - a natural outcome of the first four principles. Firms can apply both radical and incremental improvement action for pursuing perfection through engaging their people".*

Bateman, (2005) showed great concern and stated that employee engagement is not a widely used term but is absolutely vital for successful Lean adoption and it is the life blood of the continuous improvement programme. He stressed that it should not be confused with team working, although team working will definitely enhance

employee engagement as it is considered to be part of the work environment component in this context.

This point also supports Khan's, (1990) view:

> *"Engaging with our people is not a 'nice to have' it is fundamental to the success of Lean philosophy. It builds capability, ensures sustainability and motivates and mobilises an organisation's resources around what management deems important. It is also a key factor for employee satisfaction during the business improvement journey" (E6).*

This sentiment is also echoed by a senior manager of the airline company who

commented that:

> *"The Lean improvement journey is hard work! It requires great leaders, smart managers, and empowered people. Improvement cannot be delegated down, organised into a program, or trained into the people. Improvement requires more than the application of a new tool set or the power of a charismatic personality. Improvement requires the transformation of a culture to one where every single person is engaged every day, in most often small, but from time to time, large change. The success of Lean improvement is heavily dependent on engaged people"* (SMB1).

Markos and Sridevi, (2010) and Shuck, Rocco and Albornoz, (2011) observed that employee engagement involves both rational and emotional factors – what employees think (the mind) and feel (the heart) about their work and organisation. Rational factors involve the relationship that employees have with the broader organisation such as having the resources, tools, and support they need to perform their jobs. They further described that rationally engaged employees comprehends how their work contributes to the success of the organisation and have a clarity on their roles that linked to the company's objectives. In contrast, emotional factors refer to the sense of inspiration and feelings of accomplishment employees get from their work. Emotionally engaged employees feel inspired to do their best and are passionate about their work (Markos and Sridevi, 2010).

Gallup Consulting carried out an engagement survey in 2010, and concluded that the manager is important for having an engaged work force. The survey data highlighted the fact that employee engagement reflects *personal* attributes such as knowledge,

abilities, temperament, attitudes and behaviours and organisational context includes leadership, work environment and employment practices that directly affect the person, process and context components of job performance.

Johnson, (2010) observed that employee engagement can be attained by using non-financial leavers but for that it is necessary to have a committed leadership to achieve the desired level of engagement. He warned that the organisation should not ignore the financial aspect and link performance with reward.

The archive cases indicated that the airline company recognises that the Lean philosophy supports the notion of employee 'engagement value' and have initiated a number of initiatives to track and monitor. For example, a yearly survey, an improvement ideas bank, and a regular post-implementation review (PIR). PIR is a meeting where lessons learned are discussed and ideas for improvements collected. Some departments have recently introduced regular 10-minute slots for ideas discussion in their bi-monthly team meetings. Discussion with the departments' interviewees on this topic highlighted that employee engagement is considered to be a key business driver for the improvement initiative to be sustained and continuously improved. They agreed that employee engagement is a major contributing factor for individual satisfaction and inertly relates to customer satisfaction (EB1, SMB1). Experts discussed and concluded that the following are the contributing factors for employee satisfaction:

> 1) Work environment; 2) Leadership; 3) Productivity 4) Attitudes towards Lean 5) Process-standardisation; 6) Skills development 7) Communication and 8) Operations process (that contains operational dimensions such as processing time, rework, work in progress and other non-value added activities)

It is concluded that the 'engagement value' concept provides an understanding of the way in which employees perceive the outcomes of the Lean improvements and trade-off factors that impacts their satisfaction.   By including the employee

engagement concept it will certainly enrich the foundation of the proposed framework and therefore it should be investigated to gauge the understanding of how Lean improvements can enhance employee satisfaction.

SMB1 validated this view and explained that there are a number of benefits associated with employee engagement evaluations/appraisals.

> *"The evaluation allows us to let our people know that we care about them: what they think, how they're feeling; it provides [us] with the quantitative data to measure progress and to help us drive discussions and to ultimately make better decisions. It also helps us to keep the momentum of the improvement change."*

SMB1 explained that our challenge is constantly trying to find ways to connect with individual employees. We believe that:

> *"Engagement for our improvement initiatives is inherently important. We must be prepared to face the inevitable consequences if we neglect employee engagement evaluations. If we ignore [engagement], we ignore the variation and diversity that exists in our organisation, and it can cause lower profitability, higher turnover and lower customer ratings"* (SMB1).

The following section discusses aspects of the employee dimension, which have been identified through case study discussions and related literature to further enhance the proposed conceptualised framework that is represented in the Figure 3.2. The following sub section discusses above specified contributing factors in some detail.

6.4.2.1 Work environment

Emiliani, (1998) claimed that when an organisation creates the internal conditions that enable people to do their jobs effectively, drive high levels of employee engagement and energise the workforce, the combination can produce a significant performance lift.

When 'work environment' and its links with Lean improvements points were discussed, a consultant commented that:

> *"There is no greater measure of respect for the individual than creating a work environment that embodies a philosophical and cultural commitment. And this all begins with Leadership. When Leadership is committed, then the organisation creates and supports appropriate systems and behaviours"* (E3).

The empirical evidence of one departmental case study pinpointed that Lean improvement increased their focus on prevention rather than closely monitoring defects results. The evidences also recorded improved partnership and flexible working because the new process enabled empowerment to devise a shift pattern. This finding was confirmed with an expert as well as a service delivery manager, who shared their views:

> *"The way of work allocation now that people are nominally in teams but not locally located means that the delegation of work is easier where teams can be allocated work rather than individuals. This means that variation in workload can be spread fairly across people"* (E2, SA1).

Within the departments, evidence has shown that cross-functional teams were assessing, analysing and improving their processes. It was noted that this team formation was important and it generated buy-in from the participants. However, it was noticed that there were mixed feelings about team working. During an interview a question was posed to confirm the observation, a consultant and Lean team manager both commented that:

> *"Managing a team of people for an improvement initiative who share a deep understanding and commitment for improvement and to the key concepts and Lean principles is much easier than managing the work of those who are only doing what they are told. Knowledgeable employees who understand relevant business improvement principles are far more likely to make good decisions about the direction and appropriateness of their ideas for improvement. Our experiences have shown us that when employees have a clear sense of direction and strategy and have a real-time measure of contribution, they become a powerful force for propelling the organisation forward"* (E6, E8).

6.4.2.2 Leadership

Seijts and Crim, (2006) claimed that for employee engagement top management must support and this should be highly visible to all employees. The leadership team

should create the organisations' mission, vision and values and uphold a set of behaviours that supports it. Great leaders are required for employee engagement. Seijts and Crim, (2006) claimed that such leaders:

- o Should be passionate to lead and engage - inspire passion and commitment in others
- o Should connect employee goals and accomplishments to the organisations' goals
- o Should be accountable for themselves and their employees in reaching set goals.
- o Should make expectations clear on quantitative goals - behaviours and skills required to achieve the goals and live the organisations' values
- o Should develop their talent – promoting employee engagement
- o Should coach and provide recognition for both successes and failures

On the topic of Lean leadership, an academic mentor shared this quote from the Shingo framework:

> *"Because I Lead with Humility (the principle); therefore, I am open to good ideas and innovation from anywhere in the organisation (the value). Because I Lead with Humility (the principle); therefore, I accept responsibility and enable change (the value). Because I possess humility (the principle); therefore I seek, trust, and follow the direction of those with a responsibility to lead (the value)"* (E5).

He then explained this quote further by giving an example; he said:

> *"Simply stating important values such as safety first, empowerment, or open communications often fails to create uniform ideal behaviours throughout the organisation. This is because these values are 'what's' that fail to answer for people the question of 'why.' A principle answers the question of 'why.' If they respect every individual (the principle); therefore, they always place safety first (the value). Because they have respect for every individual (the principle); therefore, they empower people to act independently (the value). Because they have respect for every individual (the principle); therefore, they make all of their communications open and transparent (the value). When people understand the 'why,' they are far more capable of consistently interpreting the correct behavioural implications of the value, the 'what.'"* (E5).

Operational management literature mentioned a word 'humility' and recorded that this is a common trait among leading practitioners of operational excellence. Emiliani *et al.* (2003) defined humility as an '*enabling principle that encourages learning and improvement*'. They further point out that associates must feel respected and energised and this is due to a leader's willingness to seek input, listen carefully, and continuously create an environment for them to express freely. To support this view, a Lean consultant commented that:

> *"One can learn something new from anyone. Improvement is only possible when people are willing to abandon ownership, bias, and prejudice in their pursuit of a better way"* (E2).

6.4.2.3 Productivity

Lean philosophy's focus is on reducing process waste and improving process flow, and that results in a greater process efficiency and increase in productivity (Womack, 2004).

This finding prompted to hold further discussions with the senior managers of departments B and C, both commented that:

> *"There's a link between employee engagement that leads to productivity improvements resulting improved performance and customer satisfaction. Companies with engaged workforces have a superior return on assets, profitability and nearly double the shareholder value. There's also a link between employee engagement to improvement sustainability and commitment to on-going improvement"* (SMB1, SMC1)

SMC1 elaborated this point further by referencing external research carried out by Gallup counsulting in 2010, who examined engagement in work units across companies and the resulting productivity measured as turnover rates and profitability; they shared the results as following:

- There was a 31% turnover difference between the top and bottom quartile work units in high turnover organisations, and a 51 % difference in low turnover organisations

- At the company level, top quartile organisations registered 2.6 times greater growth in earnings per share compared to their competitors

Empirical evidences from the cases suggested that staff witnessed the improvements in efficiencies and are therefore pleased with the results of Lean improvements. During the Lean forum, it was asked to share their own view on productivity; they commented:

> *"With Lean improvements in our department, most people now think it is a nice place to work since we have removed some of their processing barriers and simplified their processes. They have become more productive"* (CA3).

Another member of their department supported and commented that:

> *"I think the better service we do the better life we all have the better we do our job"* (CA1).

However, a Lean expert (E5) commented that in our airline company there is a strong union presence. To introduce any improvements we engaged them to minimise resistance to change at implementation stage. He gave an example of eTicket refund process improvement where a union representative was involved from the start of the initiative that gained union support. From the beginning the benefits of approach on employee morale and improvements into their working practices were acknowledged and communicated. He stressed that our policy on no compulsory redundancies provided a back-up support from unions and that has influenced their willingness to adopt Lean. During the discussion with the consultant (LC4) it was highlighted that because there were effective communication sessions held to raise awareness of change and benefits of Lean improvements, it was sure to have more resistance from staff.

6.4.2.4 Attitudes towards Lean

A number of articles in the literature review stated that Lean allows companies to become more efficient. However, a high rate of failures has been also reported. Womack and Jones, (2003) have observed that for successful Lean implementation, commitment among employees and leaders is vital. They expressed that

commitment relies on attitudes formed at early stages of the change process. Thus, it is important to be able to influence attitude formation early in the change process (Womack and Jones, 2003).

Employee interviewees of the airline company shared their experiences of introducing change through applying Lean into their business area. The following few paragraphs records their comments.

Operational Manager (OA1) commented that;

> *"The experience of Lean improvement involvement is very different. I was very sceptical at first about another improvement initiative - will anything change? My initial reaction was 'do I have to go on this?*
>
> *My first reaction was 'how do I get out of this? I wondered 'could it work? - no chance. I would like to see more of Lean. My initial reluctance has completely changed.*
>
> *The most recent experience I had in the improvement initiative I am currently responsible of and now deliberately to free people up - the guy who presented is a junior rank - at the beginning of the week - he said I'm just a junior in the rank and I said we want you because you are the guy doing the job - only you can tell us how to do it. By the end of the week he was impressive"* (OA1).

An external Lean expert (counsultant E3) added:

> *"There is a customer focus attitude: that they are there to serve the community - not we are in the 'ivory tower we know best'".* (E3).

This was then supported by Service Deliver Lead from NA region and another Senior Manager who is also a Lean expert added;

> *"General role of Lean thinking is increasing. Customer focus - Lean thinking helps. I was looking at how we could collectively help in improving the process from the flying customer point of view. Customer involvement is at the heart of the… plan and our department has tried to ensure that the customer's voice is heard during the redesigning of the process."* (SA1, E9)

From the above comments, it can be concluded that the experience of participating in Lean improvements raised awareness of Lean as a philosophy and thus shift in their attitudes towards change and indeed trust in Lean as an improvement strategy.

6.4.2.5 Operations process

An Operations Manager (OA1) described the application of Lean in their business area as a strategic approach and revealed that it has shown improvements in the area of reliability, cycle times, costs in terms of less total resource consumption, quality, and productivity. He added that in our department people are guided by process and commented:

> *"In my experience, staff are generally happy with the results of the Lean changes to the operation process. A particular characteristic was where the management team saw efficiency improvements as helping them in their own work and their enjoyment of the work. This had led to a significant decrease in staff turnover which was now around 4% compared to previously 25 - 30%"* (OA1).

This view was echoed by a Process and Architecture Lead from the department C and another expert:

> *"The process improvements had made a difference to various dimensions of performance and had fundamentally changed the shape of the organisation and the content of their jobs. In one of the projects, they had reduced the acknowledgement time to three days, with a lot of applications actually being acknowledged on the day of receipt. The processing time had been reduced to between 14 and 21 days"* (CC2).

> *"I think for some of the staff involved they have seen some changes happen that they wanted to see and are actually making that change now, which they never managed to do before. I think the general feeling of the staff here is that they are providing the customer with a better service"* (E2).

However, the expert did point out that in some other cases there was a lack of support from senior management. This resulted in delay for implementing changes. An investigation took place for the outcome of that delay and one team member (wishes to stay anonymous) commented that:

> *"Some changes were communicated to Senior Management but to nobody else. However, what I observed that those changes that were not communicated to Senior Management and it was a very deliberate. Some of these changes were deemed not to be part of the department policy hence caused Senior Management to react unfavourably to the*

change suggestions. At the same time some changes have also been
quietly implemented without Senior Management knowledge."

6.4.2.6 Process standardisation

When asked to define the 'standardised work' for the case airline company, an
expert said:

> *"Standardised work is the process of developing the best way currently*
> *known to execute an activity or task and then ensuring that everybody*
> *is capable and consistently apply this way for process execution"* (E4)*.*

An expert (E4) added that it is not possible to standardise all sub processes, but
stressed that there are some areas may be exempted. According to Adler, Goldoftas
and Levine, (1999) in services standard work destroys creativity and flexibility. When
this view was quoted to an expert, he responded that in our services standards are
seen as a liberation rather than restricting us, it is considered as a force for
empowerment. He emphasised that our activities flows are scripted but are also
flexible and adaptable.

When it was asked, how standardisation is carried out in their department, an expert
responded:

> *"For standardising our processes, first we identify the key processes (process*
> *that serve an external customer) and then we identify the secondary*
> *processes that supports our primary processes. We evaluate and determine*
> *why these processes are important to our customers and then why are they*
> *important to our department and the company. This exercise helps us to*
> *identify processes that impact the bottom line or provides a unique value*
> *proposition to customer"* (E4).

Womack and Jones, (2003) confirmed that process-standardisation assist process
stability and creates a consistent system. They stressed that stability is a
prerequisite for improvement as it provides a base to identify problems and resolve
for continuous improvement. They added that the continuous improvement
principles rely on stability and it assists to create a flow in the process activities
(Womack and Jones, 2003). To add to this point, Porter and Barker, (2005)
commented that process-standardisation builds control into the process and

supports the principle behind maintaining improvement. When process-standardisation is in place, the work itself is controlled, it frees up the management to other activities (Porter and Barker, 2005).

Empirical evidence suggests that in the airline company, it is common practice (although not universally applied to all improved processes) to compile standard operating procedure (SOPs) documents where the essential steps are recorded in an easy to follow table.

 To confirm the SOP's point, the Business Manager (LC3) commented that:

> *"Standardised work should be considered the current best known way of working. Each execution of the process should be considered an experimental test of this way of working. Any issues or problems that arise from these experiments should be used to update and improve the standardised work (through problem solving).Thus, it is the combination of standardised work and the continual improvement of that standardised work that is the engine that drives the on-going improvement in performance. He then added that a good standard comes from a sound bottom-up questioning culture, ever seeking a better and more secure way to execute the service activities"* (LC3).

6.4.2.7 Skills development

Robinson, Perryman and Hayday, (2004) said that in order to achieve success in gaining employee engagement it is therefore an essential to develop an employee development plan that aligns and monitors the employees' job and align career goals to the organisations' strategic goals.

The evidences gathered from the airline company suggests that the development plan is customised for each employee, co-designed by the employee and fully supported by the line manager. The plan includes some hands-on experience where people can get involved to experience new ideas and learn. This in turn shifts mind-sets for change and adjusts the behaviour.

In parallel to this, the Lean CI team delivers quarterly training known as 'skill-bytes' on some tools and techniques that are used for structure problem solving. The Appendix B 1.9 contains the cases database and lists tools and techniques that were

most frequently used. This supports a recommendation made in the literature by Squazzo, (2011) who suggested that the organisation's leaders should commit in developing people and expanding their knowledge base.

A question was posed to the manager of Lean Continuous Improvement team, can continuous improvement culture achieved by knowledge transfer of techniques and tools?

The Lean Manager responded:

> *"Continuous improvement should be a part of one's daily work. Each person should be flexible to learn a new way of doing things "(*E6).

He then continued:

> *"Over the years I see evidence in our organisation improvement capabilities as our processes are becoming stable and team now have capability to look for new ways to improve".*

6.4.2.8 Communication

In 2009, CIPD staff carried out a survey of 2000 employees from across Great Britain. The survey results revealed that two way communication is key for employee engagement. The report highlights the fact that if the employee is allowed to have the freedom to express their opinions and allowed an opportunity to feed his/her views and opinions upwards it encourages employee engagement. The report identified the importance of continuous communication from the top-down to inform employees of changes within the company and relate to the employees' roles and responsibilities.

Within the literature, several scholars have mentioned that in order to support employee engagement, communication is of paramount importance. The communication between leaders, line managers and employees should be open and flow as a two-way dialogue. (Wellin and Concelman, 2005, Trahant, 2007Markos and Sridevi, 2010 and Lavigna, 2011).

Lack of communication is recorded as one of the most common reasons cited in the literature for Lean implementation/adoption failure. It was observed that the airline company is communicating through exploiting technology and applying state of the art communication channels that includes interactive emails, webcasts and the publishing material on the intranet, but there is still room for improvement.

6.4.3 Summary of concepts refinement

In summarising sections 6.4.1 and 6.4.2 shared the discussion of customer and employee value propositions. Through the experts' discussion, the following table (see Table 6.6) lists the critical aspects together with pointers for measures that can be included into the framework (see Table 6.6).

Table 6.6: The quality dimensions and measure

Key critical aspects	Key measures/pointers
Internal operations process	• Processing time • Work in progress/process (WIP) • Number of reworks and failures • Non-value added
Internal operations employee/ staff	• Work environment • Attitude towards Lean • Leadership • Skills development • Communication • Process-standardisation(SOPs) • Productivity
Technical features	• Speed of service • Accuracy of service • Flexibility of service
Functional features	• Reliability • Responsiveness • Empathy and courteousness • Assurance • Tangibles

By broadening the understanding of the proposed framework, it can be concluded that 'customer value' is considered as a key arbitrator (mediator) for enhancing customer satisfaction. Similarly, employee 'engagement value' is considered the mediator for enhancing employee satisfaction. These value concepts provides a necessary extension to the proposed framework. It is claimed that considering both customers and employees' viewpoints, the enhancement to the framework will

provide a clearer and more complete understanding on service quality improvements.

Based on the discussion above, the framework was revised and presented in the Figure 3.2. The 'customer value' and 'employee value' terms were added and this revised framework (Figure 6.1) below and could be used as a roadmap to deliver improvement results.
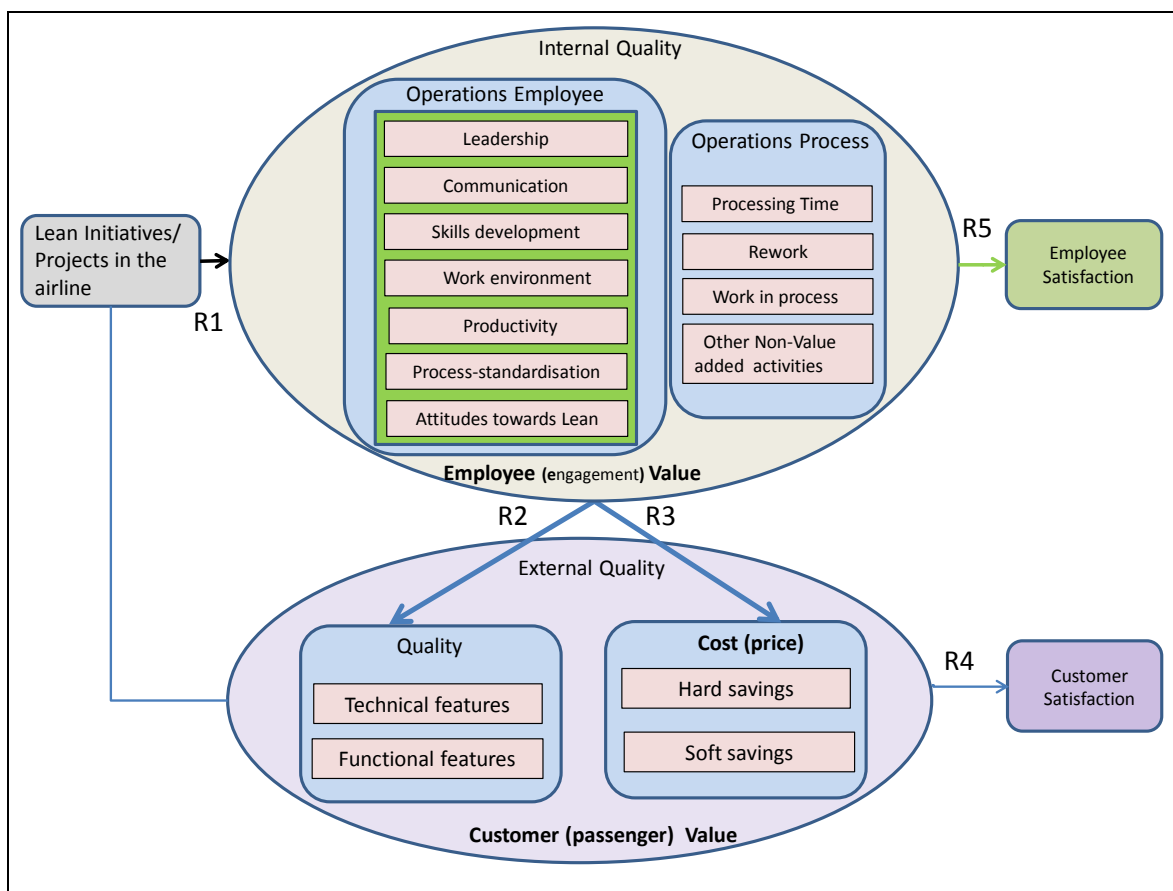
Figure 6.1: The developed framework

The next step is to verify identified relationships highlighted in the above framework, making this study more tangible.

6.5 Verification of relationships

In order to understand 'why' and 'how' relationships exists to enhance the validity of the enhanced framework (Figure 6.1) this section discusses all identified relationships. The airline's departments were revisited and a further four areas: were identified; check-in, in-flight customer support, airport experience and customer response services. Empirical data was gathered from multiple levels (see Appendix B1.2 for the list of people), where semi-structure interviews were used as a primary data collection approach. Five relationships were identified and labelled as R1 to R5 and can be seen in the Figure 6.1.

The relationships indicated as R1 to R5 in the above diagram (Figure 6.1) are described below.

- *(R1) Relationship 1: The Lean initiative improves the internal quality dimension*

- *(R2) Relationship 2: The internal quality dimension and external quality dimension are linked*

- *(R3) Relationship 3: The internal quality dimension is related with the cost/ price dimension*

- *(R4) Relationship 4: The external quality and price dimensions are the key arbitrators/mediators between Lean improvement initiatives and customer satisfaction*
- *(R5) Relationship 5: The internal operations process and operations employee dimensions are the key arbitrators/mediators between Lean improvement initiaives and employee satisfaction*

The following section details the verification of the above identified relationships in the framework by taking in account the empirical evidence, and its analysis.

6.5.1 R1: The Lean initiative improves the internal quality dimension

Review of empirical evidences and discussions with experts pointed out that Lean initiatives improved the internal quality for their business processes. It was stressed that the improvements in internal quality element had a positive impact. Insights from people at different organisational levels were obtained to further examine the relationship.

6.5.1.1 Senior manager's views

Senior managers confirmed that the adoption of Lean strategy in our airline is mainly influenced by Lean's principle of customer focus (SMA1, SMB1, SMC1, SML1, and CA3). They added that the other past attempts of business improvement methodologies, e.g. TQM and BPR, helped primarily in improving process efficiency but its application was short lived (SML1, SMB1 and CA3). To ensure that Lean sticks within the airline, we experimented first and applied Lean to back-office operations and used criteria to be time, cost, and quality (CA3).

The Lean champion from the engineering department, who is currently coaching a team to implement Lean initiatives, said that:

> *"As a pioneer, our department adopted Lean and Six Sigma concepts to improve the back-office operations; with an aim to reduce end to end time for order approver for engineering parts. We aimed to facilitate the front-office operations in delivering customers with high service quality under the slogan of 'better speed with high quality at competitive price', and wanted to increase customer satisfaction when compared with other competitors"* (LC4).

SML1 mentioned that it is true to say that the Lean initiative encouraged employees to increase productivity through process simplification and skill development. This view was supported by LA2, LA3, LC4, and LC5.

LC4 further elaborated that the existing reward and recognition programme in our company is complementary to a Lean initiative to a certain extent. They confirmed that its main aim is to motivate employees to meet with improvement goals. He added that this helps to change their attitude about Lean.

The regional sales manager explained that:

"We first adopted TQM and then Lean. The aim of adopting Lean was not only for improving the operations process, but also developing and encouraging our staff to work more efficiently under the same strategic direction. To achieve our objective, we enhanced our performance measurement and reward and recognition programmes. Leadership team acknowledged that our people are the important driver for improvement initiatives" (LC5).

6.5.1.2 Operational manager and employee views

For this step, semi-structured interviews were employed to gather operations managers and employees views respectively and to understand operational implications for Lean. From the operations managers' standpoint, Lean improvements targeted to improve process efficiency (OA1, OC1, and OC2). They added that Lean approach with use of techniques and tools provides a structure to identify problems and errors in their processes. It allows them to focus on an end-to-end view of the business process.

The operations manager (OC1) took the e-Ticket refund process as an example and described that:

"Mapping the end to end e-ticket refund process helped us to understand how to improve the operations processes efficiency by considering customer as the main focus. Besides our daily operations, we are also encouraged to improve our processes continuously to deliver customers with the best service" (OC1).

Another operation manager agreed and added:

"As a role of front operations manager, Lean facilitated us to work collaboratively with back-office operations. Since the back-office operations improved their internal processes, e.g. reducing processing time, and eliminated rework we could, thereby, deliver our customers with the promised speed, and higher accuracy" (OC3).

The empirical evidences highlighted that managers played a key role for developing Lean initiative into their operational areas. OA1, OA2, OC1 and OC2 stated that they motivated and educated their team members to consider customers as their centre of universe. However, It was observed that some operations employees had a tunnel vision of their view on customer service and lacked the wider understanding of the customer-focused principle of Lean.

A discussion took place further and operations employees agreed that through applying Lean waste analysis technique, they eliminated non-value added activities and redesigned their working practices. (SA2, SA3, SC2). They confirmed that now they have more time to focus on value added activities where they upsell their services and offer many options to their services (SA2, SA3).

The North American service delivery lead said:

> *"Resulting from the redesigning of our process, the processing time and work flow were radically changed. Operations staffs are very satisfied with the outcomes of Lean initiative. I have now more time to sale our products as well as to provide service to customers. Furthermore, this also encourages me to continue improving and developing my skill to deliver customers with the higher service quality"* (SA1).

The operations staff added:

> *"After adopting Lean at NA sales region, the operations processes were improved significantly. The newly developed process standards provided me more time to serve the customer and make recommendations about our other products to cross sell, increasing profit for our company"* (SC2).

It was observed from the gathered evidences that Lean adaptation had impacted on employees and had increased their level of engagement. This increment was due to changes in their attitude towards the streamlined approach for process execution, and opportunities were presented to then develop skills further.

6.5.1.3 R1 Summary

Empirical evidence suggested that Lean improved the internal quality for both operations processes and employees aspects. It is an evident that Lean is used as a business strategy to improve the operations and it led to increase in engagement and a change in attitude towards improvement initiatives. The findings suggests that the improvement in employee aspects has had a positive impact on both operations processes and thus improved the service offered to customers and increasing customer satisfaction. To represent the relationship between a Lean improvement

initiative and internal quality dimension, the supporting evidences are listed in Table 6.7.

Table 6.7: R1 summary: Lean initiative and internal quality dimension

Source of empirical evidence	Internal quality	
	Employee dimension aspect	**Operational dimension aspect**
The empirical study (research step 1)	Lean services focus on improving the human aspects (e.g. training, growth in skills, and change in attitude towards improvement).	Lean approach can improve business operations through process simplification, elimination of non-value added activities.
Key expert interviews	Service delivery cannot be separated. Considering employee aspect is therefore critical to Lean adoption in services.	Lean encourages process simplification and its results are measurable.
Senior managers interviews	Employees are critical to the success of Lean adoption. Improvements enhances both operations efficiency and service quality.	The objective of Lean is to improve process efficiency and it relates to time, cost, and quality.
Operations managers interviews	Lean emphasised on customer-focused approach, focusing on end-to-end process.	Lean focuses on improving the operations e.g. SLA, elimination of non-value added activities.
Operations employee interviews	People is a crucial part of Lean adoption and it is a contributing factor in Lean adoption and for achieving targets.	Lean adoption focuses on working practices to make it more efficient through eliminating non-value added activities, and redesigning the working practices.

6.5.2 R2: The internal quality dimension and external quality dimension are linked

The review of literature and gathered evidences suggest that improvement in service quality that has resulted from any specific Lean initiatives cannot be perceived directly by the customer. Nonetheless, experts and practitioners stressed a need to understand how improvement results can be linked to customer satisfaction. The external quality dimension was added into the framework in order to understand its relationship with the Lean initiative and how it can impact service quality.

This required exploring the relationship between internal and external quality dimensions. Through initial interviews for data collection it became apparent that there were a limited number of people who were available to interviews, so the different practices for data collection was adopted. A quantitative questionnaire was designed to use as a supplement for the qualitative findings.

6.5.2.1 Senior manager's views

A number of senior managers believed that the outcomes of a Lean initiative impacts customers' perception and leads to their satisfaction (LC2, LC3, LC4, and LC5). LC3 provided an example whereby he was involved in the 'Seat Redesign' initiative where they ran a survey before and after to collect customer perception. Their findings suggested that there was a significant improvement once the Seat design changes were implemented. This initiative also eliminated duplicated activities, reduced cycle time for approval and provided more ownership to the shop-front engineers, so it was win-win on all sides.

In order to get confirmation between internal and external quality dimensions and their relationships, the business manager explained:

> *"At our department, we continue improving our internal processes, with an aim to deliver customers with high quality products and services. Our organisation has changed the direction from giving customers with good service to providing them with high quality of flying experience"* (LC3).

Likewise, the promotional manager agreed and said that:

> *"The Lean adoption helps us to focus not only improving the back-office operations, but also lead us to consider the end-to-end business process. The results from improvement initiatives facilitated us to enhance customers' perception both in terms of higher quality of products, e.g. specifications, accuracy, and better service delivery"* (LC5).

From the above conversation, it can be deduced that Lean improves internal quality which is a valuable input into the external quality dimension (considering both technical and functional features).

6.5.2.2 Operational manager's and employees' views

A number of the members of the operational team suggested that Lean initiatives helped to improve their business process that impacted service quality focusing on technical features (OA1, OA2, OC1, OC2, and OC3). This is consistent with Kaplan and Norton's, (1992) view which stated that improvement in service quality can be

measured through technical features of the external quality dimension (Kaplan and Norton, 1992).

To explain how the service quality improvement relates to the customer, a manager commented that:

> *"After improving and redesigning our internal processes, I could serve customers with better speed, high accuracy within service level agreement. I noticed that customers are satisfied with the new improved service, and resulted in less complaints"* (OC1).

The service delivery lead and system operation lead also added:

> *"Through the Lean initiative, we not only improved the internal operations, but improved our skill and productivity. These are important for delivering higher service quality, both, in terms of our products and services to our customers"* (SA1, SA2).

The sales area branch manager and NA service delivery lead mentioned that the improvement in operations processes increased customer satisfaction since the initiative enabled employees to join the customer service programme (SA1 and LC5). This finding is aligned with Douglas and Fredendall, (2004) who underlined the importance of employees' skills development as a result of the improvement initiative and that in turn leads to an increase in customer satisfaction.

At this point, It was decided to gather the qualitative evidences and circulated thirty (30) questionnaires with the help of the promotional manager (E5). The rationale behind this survey was to recognise the link between the internal and external quality dimensions. Sales area branch managers and contact-employees were the target audience, and provided quantitative data as supporting evidences. The survey participants were requested to indicate (using a seven-point Likert scale) how internal quality improvement are viewed and its impact on the external quality dimension. Survey questions and responses are provided in Appendix B 1.6 and C 1.1 to C 1.4 respectively and the statistics are summarised in Table 6.8.

Table 6.8: The statistics for quality dimension

External quality dimension	Sales area branch managers (N=15)		Contact Employee (N=15)		Average (N=30)	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Technical features aspect						
Accuracy	6.67	0.49	6.53	0.52	6.60	0.50
Speed	6.13	0.64	6.00	0.76	6.07	0.69
Flexibility	6.60	0.51	6.53	0.52	6.57	0.50
Functional features aspect						
Reliability	5.87	1.06	5.73	0.65	5.80	0.88
Responsiveness	6.02	0.84	5.96	1.13	5.99	0.99
Assurance	6.02	0.84	5.96	1.13	5.99	0.99
Empathy	5.50	1.48	4.63	1.30	5.07	1.45
Tangible	5.67	1.26	5.62	0.78	5.65	1.04

The descriptive analysis shows that the average scores of technical features are greater than 6.00 (Meanacc = 6.60, Meanspe = 6.07, MeanFle = 6.57). The functional features indicated a moderately high score (Meanrel = 5.80, Meanres = 5.99, Meanass = 5.99, Meanemp = 5.07). On the other hand, the tangible factor score was low (Meantan = 5.65).

These results show a relationships between internal and external quality dimension. In order to understand the degree of relationship that existed between both quality dimensions, a decision was made to develop a relationship mapping matrix. This is described in the following section.

6.5.2.3 The relationship mapping matrix

Based on the empirical findings and quality dimensions depicted on the framework (Figure 6.2), were included into this two-dimensional relationship mapping matrix (see Appendix B 1.10 for a full page view). In total, five operational managers and three experts were contacted to get their views and on the two-dimensional relationship mapping matrix. The data were mapped and the available scores have a range from 0 to 3 (0 means no relationship and 3 means very strong relationship). The matrix contains different colours to indicate the degree of relationship and presented in Figure 6.3.

Quality Dimension Verified by: OA1, SC2, LC3, LC4, LC5,E6,E8,CA2			Internal Quality											
			Operational Dimension				Employee Dimension						
			Processing Time	Work in process	No of Rework	Non-value added/other wastes	Attitudes towards Lean	Communication	Skills development	Leadership	Work environment	Process Standardisation	Productivity
External Quality	Technical features	Accuracy of service	1.100	1.300	2.500	0.900	2.000	2.200	2.700	1.200	0.500	2.100	2.000
		Speed of service	2.800	2.500	2.200	1.500	1.900	2.600	2.600	0.800	1.900	1.600	2.800
		Flexibility of service	1.900	1.400	1.100	1.600	2.500	1.800	2.500	0.700	0.500	1.800	1.900
	Functional features	Reliability	2.100	1.900	2.500	1.600	2.000	2.500	2.700	1.700	2.100	2.700	2.100
		Responsiveness	2.100	1.800	2.400	1.600	2.000	2.500	2.700	2.700	2.500	2.200	1.600
		Assurance	1.400	1.500	1.800	1.900	2.100	2.000	2.500	2.400	1.700	2.500	1.200
		Empathy	1.200	1.200	0.900	0.900	1.000	1.000	1.700	2.500	2.700	0.500	1.700
		Tangibles	1.100	1.000	0.800	0.500	0.800	1.000	1.100	0.700	0.500	0.500	1.600
Price			2.500	1.700	2.500	2.000	1.700	0.500	1.800	1.400	2.500	0.800	2.500

2.5-3	Very strong relationship	1.5-2	Moderate relationship
2-2.5	Strong relationship	0-1.5	No and weak relationship

Figure 6.2: The two dimensional relationship mapping matrix

As it appears that the operational dimensions was found to be related with the technical features. Two (processing time, nunmber of rework and work in process) indicated to have the *very strong relationship* as it is critical to the speed of service, reliability and accuracy. A *strong relationship* was identified between operations dimensions and functional features in particular for reliability and responsiveness. This is similar to the findings represented by Newman, (2001) who studied UK services and concluded that improvement enhances the reliability and responsiveness factors of service quality.

The *weak relationships* were also identified implying that internal quality improvement may not necessarily enhance empathy and tangibles - two criteria used for external quality dimension.

Now considering the relationship for the operations employee (employee dimension), this is closely linked to both technical and functional features. For example, skill development and productivity shown as having a *very strong relationship* with both technical and functional features. The employee's attitude towards Lean highlighted as important to deliver services to customers.

The survey results provided an additional data to support this second relationship since very strong relationships were identified between operational process and technical features; and between operations employee and functional features. This analysis is in line with Scheider and Bowen, (1995), and Howcroft, Hamilton, and

Hewer, (2007) points of view where they argued that employees' attitude and satisfaction has a positive impact on service quality, and that relates to the functional features.

6.5.2.4 R2 Summary

To verify this relationships qualitative and quantitative findings were used. It highlighted that identified relationship relates to technical features and it is critical to the customers' perception. The empirical findings are summarised in Table 6.9.

Table 6.9: Internal and external quality dimensions relationships summary

Dimension	Internal operational dimension	Internal employee dimension
Technical features (Qualitative evidence)	It was highlighted that Lean improvement results show improvements in technical features e.g. speed, accuracy and flexibility.	The improvement in operations was significant in delivering the high service quality and links to functional and technical features, such as skill development, improved speed, accuracy.
Technical features (Quantitative evidence)	There is a strong connection between operations processes and technical features (ref- seven-point Likert scale and in the relationship mapping matrix).	Operational employee aspects represented associations with technical –functional features.
Functional features (Qualitative evidence)	Operations process related with functional features with degree of overlapping between technical and functional e.g. speed and reliability of services	Relating to the functional features, operations employees were considered critical. Operations employees have responsibility and could impact on the customer.
Functional features (Quantitative evidence)	Operations process related with functional features, and share some degree of overlapping with technical.	A very strong relationship between operations employees and functional features. Employees expected to provide high service quality to customers

Internal dimensions were important for enhancing both technical and functional quality. These findings are in line with Voss *et al.* (2003) who argued that employees are important elements for enhancing service quality and customer satisfaction. Amaratunga *et al.* (2001), and later Bouranta, Chitiris and Paravantis, (2009) added that a link exists between internal and external quality and this should be used as a base for evaluating the Lean improvement results.

6.5.3 R3: The internal quality dimension is related with the cost/ price dimension

The review of the literature revealed that organisations focus on the cost dimension when they consider Lean strategy and the empirical evidences from the airline company confirmed that cost savings were an important measure for their Lean projects.

6.5.3.1 Senior manager's views

Discussions with the senior management confirmed that hard and soft cost savings were considered and were important in all of their Lean improvement initiatives and their results (SMA1, SMB1, and SMC1).

6.5.3.2 Operations manager's and employee's views

The operation manager of Department A commented:

> *"In our department, the improvement projects aim primarily to improve the operations processes to increase the efficiency and productivity. Nevertheless, all these improvement criteria lie in the focal objective of cost reduction, thereby achieving the long-term profitability. The successes of all improvement projects were evaluated and measured in terms of pound-saving"* (OA1).

This empirical evidences supports the viewpoints of Garvin, (1987), Anderson *et al*, (1994) as they argued that improvement in operations reduces the costs associated with products and services that has an impact on price. To understand this relationship, the documentation of departments' improvements project were investigated.

In addition, several members of the airline company were contacted who commented that: *"for Airline services' main sources of income is generated from 'ticket sale price' and 'upgrade cost' charged to customers"* (LA2, LA3, LC2, LC3, LC4, and LC5). Customers perceives these as the service 'price'. They elaborated that the pricing in the airline services plays an important role for competing for customers with other

airline services (LC2, LC3, and LC5). However, both the commercial performance lead and the revenue planning operational manager commented that pricing in the UK business travel market is currently fairly balanced (SA3 and OC3). They explained that airlines typically try to segment their customer base into different levels and offer an appropriate rate to retain their existing customers. They run price-sensitive campaigns to provide a persuasive discounted rate to new customers (SA3 and OC3). To understand the pricing used for different segments, it was advised not to record any details due to the sensitivity and confidentiality of the business.

In conclusion, all it revealed that the pricing of airline services varies little in the UK. This leads to an important agenda for any UK airline company: to adopt business improvement strategy to improve their operations with a focus to reduce costs.

Discussing this point further, the operational manager from department C added that:

> *"Lean combined with Six Sigma helped us improve the efficiency of the operations processes (e.g. cycle time reduction, non-value added and wastage elimination). This significantly reduced our operating cost"* (OC1).

The results were re-examined (see Figure 6.3) where it indicated internal quality and cost/price dimensions have a strong link. These findings are in line with Rhoades and Waguespack, (2008) who noted that through work environment and productivity, operational employees hold a strong relationship with the cost dimension.

6.5.3.3 R3 Summary

Evidences show that internal quality and cost/price dimensions have a strong link. This is in line with a view point made by a number of scholars who stated that the improvement in operations impacts on improvement in efficiency and productivity, which in turn lowers the cost and achieves long-term profitability (Bateman and David, 2002 and Gustafsson *et al,* 2003).

6.5.4 R4: The external quality and price dimensions are the key arbitrators/mediators between Lean improvement initiatives and customer satisfaction

Empirical evidences have shown the airline departments did not evaluate Lean initiatives results from the customers' point of view which is also highlighted in the literature by Dean and Bowen, (1994), Detert and Schroeder, (2000), Douglas and Fredendall, (2004); Dabholkar and Overby, (2005) and Voss *et al*, (2005).

In order to get the customer's view, permission was obtained to carry out a survey. The following section covers the approach and its findings.

6.5.4.1 Customer satisfaction survey

The SERVQUAL model was adopted to design a questionnaire to examine how price as a feature of external quality influences customer satisfaction (see Appendix B 1.7). In total, one hundred (100) questionnaires were circulated to department A's customer base; 63 questionnaires were returned. Detailed responses can be found in Appendix C 1.3 and results are recorded in the following Table 6.10.

Table 6.10: Customer survey results

Service Quality Dimensions	Average score (Mean)	Standard deviation	Average score each criteria
Technical features **6.01**			
Accuracy of service product (e.g. accuracy in refunds)	6.16	0.99	
Service speed	6.08	1.00	
(refund approval period)	5.79	1.05	
Reliability **5.98**			
Deliver service as promised (e.g. call back as promised)	6.11	1.02	
Communications and progress update	5.60	1.20	
Accuracy in service	6.10	1.00	
Promptness in Q/A	6.13	0.94	
Responsiveness **6.15**			
Willingness to assist	6.30	0.93	
Request response	6.08	0.97	
Provide prompt service	6.16	0.92	
Attentiveness to Q/A	6.05	0.97	
Assurance **6.25**			
Data protection	6.37	0.75	

Knowledgeable to queries	6.14	1.06	
Polite	6.24	0.89	
Trust with confidentiality	6.27	0.83	
Empathy			**6.28**
Attention to needs	6.29	0.87	
Acknowledge at first point	6.32	0.80	
Helpful with Q/A	6.27	0.81	
Friendly and caring	6.25	0.88	
Tangibles 6.09			
Appropriate facilities (convenient, clean)	6.10	1.13	
Modern – state of the art (e.g. on-line check-in machine)	6.11	0.84	
Professional look of customer contact staff	6.14	1.06	
Documentation associated with service	6.02	1.26	
Price of service			**5.77**
Fee/Charge per ticket transaction	5.81	1.16	
Ticket rate comparison	5.73	1.31	

6.5.4.2 Survey analysis and discussions

The results recorded in Table 6.10 proposes a connection between external quality and customer satisfaction with a high score (>6.00). For customer satisfaction, both technical and functional features were critical with empathy and tangibles score was important. Although the results from the relationship mapping matrix (Figure 6.3) suggested that there is a link with the internal quality dimension, thus it implies that Lean initiatives have less impact on these soft aspects.

As it appears, the link between price and customer satisfaction appears as least important. However, the average score as moderately high. Therefore, the price should be reflected as mediator/arbitrator, as well as external quality dimension.

The functional features average score appears higher than technical features and price. Some scholars argued that functional service quality is more important to customers than technical service quality (Grönroos, 1984 and Parasuraman *et al*, 1985).

Since survey results numbers were still considered to be small in order to draw a valid conclusion, this relationship was discussed with practitioners. Senior practitioners' were queried to gain more understanding on customer expectations for airline services. Their view was that airline service composed with t*he travel product which* is similar to the product specification meals, size of seats and t*he flying services* requires the interaction between employees and customers during the service delivery process. The travel product is closely linked to the technical features of service whilst flying services is closely linked to the functional features of service. They stressed that these two aspects were important to customers' satisfaction and can be referred as external quality dimension. They added that these two are interlinked and cannot be separated since it is delivered simultaneously (LA2, LA3, LC2, LC3, LC5 and SMC1).

With the above viewpoints it was decided to summarise the passenger (customer) expectation criteria relating to the travel product and flying service and recorded in Table 6.11.

Table 6.11: The passenger expectations

Passenger expectation	Criteria	Implication
Product expectation	Speed (committed SLA) Price (ticket and upgrade) Accuracy (billing) Flexibility (product features)	These are closely related to **technical** features of service quality
Service delivery expectation	Hassle-free service After sales service Attentively service Responsiveness Reliability Convenience Relationship	These are closely related to **functional** features of service quality

6.5.4.3 R4 Summary

The above discussed findings indicated that for airlines it is essential to consider 'customer value' and there exist a relationships between external quality and cost/price dimensions. This view is similar to Cronin and Taylor, (1992), Anderson *et al.* (1993), Lassar *et al.* (2000), and Douglas and Fredendall, (2004) who stated that customers' perception of service quality and their satisfaction are linked together.

6.5.5 R5: The internal operations process and operations employee dimensions are the key arbitrators/mediators between Lean improvement initiatives and employee satisfaction

The literature on the subjects of engagement, sustainability and continuous improvement, highlighted that all levels of employees must be able to contribute value and must be empowered. This view is in line with a number of scholars viewpoint (Taborda, 2000, Salanova, Agut and Peiró, 2005, Konrad, 2006, Clifton, 2008 and Ajzen, 2011).

The literature review also indicated that although people engagement is necessary for making change stick, the reality is that many managers do not want to lose control over their subordinates (Taborda, 2000). Hodson and Rosgicno, (2004) confirmed that conflict between managers and team members is a common occurrence that erodes a shared sense of purpose. These scholars have documented data that substantiate that it is difficult for organisations to overcome the chronic 'us versus them' syndrome between different levels of the organisation and employees.

Empirical evidence pinpointed that the airline's departments paid less attention to observing Lean initiatives results from the employees' viewpoint. If it was done, it was done haphazardly. Both experts and practitioners stressed that it is important to evaluate Lean improvement results from an employee perspective for sustaining the improvements and creating continuous improvement culture.

To understand this phenomenon better the Lean team manager (SML1) recommended collecting employees' views on their experience of Lean to date. This was discussed with the managers of departments A and C to get their buy-in and to agree a suitable approach. Both managers recommended a survey questionnaire for ease and convenience to gather qualitative data. The following section details the survey activity.

6.5.5.1 Employee satisfaction survey

The first draft of a survey questionnaire contained 70 statement-based questions by taking ideas from post implementation reviews, where a questionnaire was often used. The experts (E4, E6) reviewed the design of the survey questionnaire, and advised that a questionnaire should contain fewer statements and include some free format text boxes to solicit respondents' views. Hence, the recommended format was used and redesigned the questionnaire to contain 25 questions (see Appendix B 1.8). The survey questionnaire was circulated to both departments (A and C) and their team leaders requested full participation and encouraged a high return rate. Employees were advised that all responses would be strictly confidential.

The survey was handed out randomly to 75 employees in departments A and C. Survey participation was solicited during bi-weekly team meetings and an away day activity. Once pen and paper surveys were completed, employees were instructed to place their forms in sealed envelopes that were then returned to the researcher after less than four weeks. In total, 52 completed questionnaires (70% response rate), a full survey analysis can be found in Appendix C 1.4.

To analyse, the information was categorised into seven subjects, as discussed previously: (a) Leadership; (b) Communication; (c) Work environment; (d) Productivity; (e) Attitudes towards Lean; (f) Skill development; and (g) Process Standards. A reliability analysis was calculated for each survey topic. Table 6.12 illustrates how survey questions were associated with specific topics.

Table 6.12: Mapping of survey questions to topics

Topic	Closed Questions references	Free format Qs references	Comments
Work environment	1,2,4.11.12	17,18,19,21,22,23,24,25	
Attitude towards Lean	5,8,13,14,15	20	
Skills Development	6,7	16	
Communication	3		Included in free format/multiple choices
Productivity	10		Included in free format/multiple choices
Leadership	9		Included in free format/multiple choices
Process-standardisation	none		Included in free format/multiple choices

The descriptive statistical results are provided in Table 6.13 for questions one to fifteen. These results were accumulated and shared with senior managers and experts.

Table 6.13: Average score for employee engagement indicator

Employee Engagement indicators	Avg Maximum score of three dimensions
Skills Development	7.0
Work environment	6.2
Attitudes towards Lean	4.8

The results indicated (see Appendix C 1.4) a spread of opinions in the range on a seven-point Likert scale (Table 6.13 above contains the average for the three dimensions), whilst the result from the relationship mapping matrix suggested that communication and skills development have been found to have a significant relationship with the quality dimension, implying that these two soft aspects has a high impact on service quality.

It was noted that the survey sample was too small (0.15%) to make any meaningful conclusion. Therefore, investigation was continued with survey answers through discussing with a group of people who were involved in the prior investigation. The following few paragraphs covers the analysis of returned questionnaires together with the discussions held within departments A and C.

6.5.5.2 Employee satisfaction survey analysis and discussions

Statement 1: Link between Lean with strategic direction

Respondents appear to know Lean approach used as a business strategy, (92% (51% = 1; 41% = 2)) of respondents either strongly agree or agree.

Statement 2: The Lean team provide support

Positive responses indicated that the central Lean Team provided support, with 88% of respondents strongly agree or agree with the statement.

Through informal discussion with Lean consultants, a comment made that there were regular email exchanges with the department they were working and they passed on any information on upcoming changes.

In general, there was a strong indication of support given by the Lean CI team, in particular Lean training. The aim of this training is to develop in-house capability to support Lean with the skills to implement Lean in their areas, claimed by a Lean champion (LA3). One survey response contained a comment:

> *"I really like the fact that we are doing this for ourselves... that we are building our own capacity, experience; that we're building our own way of teaching ourselves. Because we're just not reliant on contractors and I think that it's worked really well. I'm very pleased about that."*

Statement 3: Good communication about the Lean programme

Respondents agreed with this statement but the results were not as positive compared with other statements. 75% of respondents strongly agree /agree with the statement. However 25% of employees did not agree with this statement. This may be some departments were good with their communication and some departments were still playing catch-up.

Statement 4: The impact of the Lean programme

Approx. 40% of respondents were less familiar with Lean impact outside of their own department. However around 60% of employees were aware of what was happening in other departments.

Discussing this point with Lean team manager, he stated that:

> *"The monthly conference calls are held with the Lean team where as many Lean consultant and their Lean champions together with their change team members as possible. If a Lean consultant was busy with a department, s(he) was expected to give an update on the engagement and report any problems or successes"* (SML1).

To support this, E6 confirmed that:

> *"There is a good support network amongst them, including meetings with other departments' Lean champions, and other industry Lean experts, who they meet through quarterly Lean forums"* (E6).

However, there were two comments that suggested that some people were less familiar with as comment read:

> *"I am not aware of how Lean is being implemented other parts of the business. I am familiar with how Lean is being implemented in the [our] area. "*

Another comment stated:

> *"There was some communication through the Unions about job cuts which made people unsure of Lean. I am aware of the other Lean work but not really interested"*

Statement 5: Lean is appropriate to the organisation.

Approx. 45% responded Lean as a new concept but some responded that they were aware of Lean application inside-outside of the airline organisation.

Statement 6: The tools and techniques training.

Approx. 60% of respondents said that the Lean tools and techniques were new to them. During the discussion with a Lean consultant it was mentioned that they run regular courses on process mapping and structured problem solving.

Statement 7: The use of tools and techniques

95% responded agree or strongly agree with this statement. Conversation with the Lean manager revealed that without practicing some Lean tools and techniques, it would have been difficult to do process analysis/ waste identification. The internal Lean training was discussed and it was highlighted that the combination of class-based training and the practical scenario training were delivered. The more senior Lean experts become a mentor to new Lean consultants and coach them through their first Lean engagement.

Statement 8: Lean Implementation.

Approx. 45% responses were either strongly agreed or agreed with this statement, and 20% disagreed with the statement. Some departments faced more resistance and it was directed more towards management team rather than the change initiative. This revelation intrigued the author and some explanations were requested. Two people shared their views who would like to remain anonyms:

"We have observed and learned that our leaders should be held accountable for various operational failures. There are many failures that were driven by leaders' lack of communication. In our opinion, when leadership demonstrates that worker contributions are valued, this two-way communication creates an avenue for employees to display higher levels of commitment to workplace improvements".

To stress this point further, in literature, Goffee and Jones, (2001) stated that when leaders give credence to an individual's work, they are rewarded with loyalty, even obedience; the leader has given greater meaning to a follower's work life, and as a basis for a relationship, the work relationship is not just sturdy, it is as solid as cement.

Statement 9: Senior manager's commitment for increasing performance.

40% agreed and 15% disagreed but there were 45% of respondents not sure. In two surveys it was stated that senior management commitment for the Lean initiative within their department was important. However, it was expressed that managers still need to continue to drive Lean. One comment was:

"Managers have had to push and drive the use of the SOPs, so that they would be implemented. They still need to drive their usage but they have had a positive impact."

Statement 10: More focus on improvement.

Approx. 60% of respondents agreed or strongly agreed with this statement, while 15% either disagreed or strongly disagreed. Also 25% were unsure. In discussions with Lean consultants and champions, they said that group who attended the Lean training were keen on more process improvement initiatives to kick start than people who had not had any training.

Statement 11: The Lean programme to meet customer requirements.

65% of respondents disagreed or strongly disagreed with this statement, with only 35% agreed. This may be the case where those who responded may be confused with improved performance of improved processes with improvement made in the customer service.

It was observed that where Lean had big impacts on processes or resulted in 'quick wins', the attitudes towards Lean were positive.

Statement 12: Lean to match staff resources.

80% respondents disagreed or strongly disagreed. To clarify this point further, the Lean team was contacted. Both Lean consultants and the team leader commented that there is further scope for improving this element with better use of control tools and techniques. The team manager took a note to this and stated that they need to explore this further.

Statement 13: Lean spread into other departments.

70% of respondents strongly agree. Lean consultants, champions and business managers all stated that Lean concepts must be carefully woven into departments, and that Lean success and achievements should be celebrated. To underpin this discussion, E6 mentioned that:

> *"Over time, with each Lean achievement and its celebration, we are indeed nurturing the Lean approach, highlighting the essence of a strong team and uncompromised commitment to continuous improvement: a commitment to one's peers, to the attainment of departmental and organisational goals, and to the future prosperity of the company"* (E6)

Statement 14: Lean sustainability

75% respondents agree or strongly agree, however 25% were unsure or disagreed with the statement.

To dig a little deeper with this point, the senior management team were contacted. SML1 confirmed that there will be support provided to Lean consultants beyond 2013. Many of the Lean consultants believed that there should be a permanent team of Lean consultants within the airline company to help embed some of the changes and to have more experienced people to build Lean expertise.

During the discussions, it was noted that Lean consultants were making a difference on initiatives where they worked alongside with local improvement team for a longer period. It was observed that this resulted in increased Lean awareness and acceptance within the department and enabled a cultural change.

In contrast, where the Lean consultant was implanted for a shorter timescale, only a few members showed acceptance. It was observed that challenges regarding Lean initiatives were not directed at the Lean consultant but towards their role and their knowledge. During one conversation, the Lean team manager confirmed that they are considering continuing their involvement for maintaining the company's desire to practice Lean, and to create continuous improvement culture (SML1).

Statement 15: Lean future beyond 2014.

75% responded agrees that the Lean programme should continue beyond 2014. Sustainability is considered to be an important point and therefore it was discussed with a number of Lean consultants and champions to confirm whether the changes

within departments will be sustained over the period and beyond. In response, both LC2 and LC3 answered affirmatively and gave examples of three projects within their areas where they are applying the learned Lean tools and techniques after the first implementation, and that the first phase of the project had been completed six months ago. It was observed that staff were motivated to continue to use Lean philosophy. These evidences suggest that there is a future for Lean within the airline company and recognised that Lean is a journey not a destination.

Question 16: The key principles of Lean

This question was added to the survey to gauge employees' level of understanding on Lean principles. Respondents had no restrictions they could highlight as many options as they considered relevant. The principles that are crucial for understanding Lean as highlighted in the literature were presented as options marked with ** (see Table 6.14)

Table 6.14: Application of Lean principles

Options	Number of Responses	% of Responses (rounded)
Right First Time**	45	12%
Pull**	35	11%
Standardising	45	11%
Value**	45	11%
Flow**	44	10%
Problem Solving	43	10%
Waste	42	10%
Efficiency	40	9%
Streamlining	35	8%
Value Stream**	30	8%

The table above illustrates that some respondents shown some understanding of Lean principles, however, approx. 45% of respondents highlighted all of the options as principles and therefore all of the five principles were included by default.

Approximately 45 survey responses recorded 'process-standardisation' as the Lean principle. One responded also added a comment:

> *'The outcome of the last Lean project was to update our current process. Since the new process changed so significantly, we decided*

> *to develop a new SOPs and the rollout of that SOP is planned in end of 2014'.*

Responses from the survey indicated that SOPs practices enabled standard work practices. However, the results from the relationship mapping matrix (Figure 6.3) indicated that the process-standardisation had a weak relationship with the internal quality dimension. With more discussions, the truth was revealed that the SOPs were often amended or tailored to the local context and raised some concerns. In response to this, the Lean team manager commented:

> *"What is important is that a balance is found between creating a standard way of working which also allows local contexts to be absorbed"* (E6).

Question 17: Strategies for employee engagement.

The common comment listed option of consultation or increased communication. The channels for communications were newsletters, videos or briefings. The use of structured training accounted for a 7% whereas 13% recorded for workshops to raise awareness, as shown in Table 6.15.

Table 6.15: Strategies for Employee engagement

Comment	Number	%
Staff communication	11	25%
Awareness	6	13%
Meetings for improvements	4	12%
System thinking in practice	4	10%
Empowerment	5	8%
Reporting	4	9%
Delegation of tasks	3	7%
Training	3	7%
None	2	5%
Other strategies (e.g. Putting People First)	2	5%

With discussions (to find out the strategies used for employee engagement) with senior management where they emphasised that staff who were involved in Lean improvement workshops gained most understanding on Lean theory. They added that we need to spread Lean to ensure that the practical and theoretical knowledge is continually growing.

Question 18: Lean success in driving employee engagement.

85% of responded that Lean strategy had been successful / very successful.

On this point, one expert (E7) commented:

> *"After Lean had been implemented in the administration team that it became evident that the way the payment team had previously worked needed changing. There was a need to improve but at the time we were not sure what exactly was wrong or what we could do about it".*

However some negative comments were recorded on the Lean approach which was related to taking staff away from the operations to attend Lean improvement workshops that resulted team being under-resourced for operations. One responded commented:

> *'Lean has had a bad impact here and was a waste of time. As a result of attending the Lean workshop there was a backlog of work that we had to return to. We had not had a backlog of work for years and staff were very upset about this. It has taken months for us to get back to normal where we don't have a backlog'.*

Question 19: Contributing factors to Lean success.

The most important factor was listed as management's commitment (See table 6.16). However, all factors cited were similar to ones found during the literature review and included in chapter 2. The experience of the Lean was important for project implementation team, but there was no sufficient training considered. This supports the comments made in questions 6 and 7 above and indicates practical experience is more important than learning theory.

Table 6.16: Break down of success factors

Comment	Number	%
Commit to on-going improvements from management	10	21%
Delivery team - experience	6	13%
Allowed time	5	10%
Enthusiastic approach in all stages	5	10%
Facilitator for running workshops	4	8%
Constant desire for improvement	4	8%
Good plans	3	6%
Communication (effective)	3	6%
Monitoring	3	6%
Risk takers	2	4%
Training	2	4%
Flexibility	1	2%
Realistic / focused approach	1	2%

Question 20: Proportional involvement in Lean.

As displayed in Table 6.17, 42% of comments stated that less than 20% had involvement at departmental level, further 15% of comments did not know how many people were involved. Only 7% were aware that more than 25% of the company was involved in Lean and 2% of comments stated that they were planning to increase their involvement with Lean.

Table 6.17**:** Lean spread

Comment	Number
In the range of 5% and 10%	7
In the range of 10% and 20%	15
Difficult to determine	8
Everyone	15
Less than 5 %	1
Future involvement	2
More than 25%	4

Question 21: Lean implementation.

The collected views indicate that implementing Lean resulted in less processing time, improved processes and improvement in team working (see Table 6.18). However, it was noted that the team working responses had mixed views; and problem solving had low importance.

Table 6.18**:** Lean results

Options	Number of Responses	% of Responses
Less time	46	9%
Processes efficient	44	8%
Improvement in team working	43	7%
Capacity	42	7%
Standardised work	40	7%
Reduced / elimination of backlogs	38	6%
Improved work quality	37	6%
Reduced errors	37	6%
Achieve targets	35	6%
Improved motivation	35	6%
Improved working environment	33	6%
Collaborative problem solving	32	5%
Reduce stress	28	5%
Productivity increased	25	4%
Greater job satisfaction	23	4%
Performance recognition	20	3%
Performance management (poor)	19	3%
Visibility of Senior Management	14	2%

Question 22: Reasons for Lean success.

This question was similar to the discussion held with interviewees in steps 1 and 2 that included critical factors for successful implementation of Lean improvements. Respondents identified employee involvement and employee ownership as important (see Table 6.19). However, this was in contrast to interviewees' responses, who pointed out implementing quick wins is important to gain a momentum.

Table 6.19**:** Reasons for success

Options	Number of Responses	% of Responses
Adequate staff involvement	42	18%
Quick wins implementation	38	12%
Change ownership	35	13%
Involvement with change	36	13%
Effective communication	32	12%
Senior Management commitment	27	13%
Training	29	11%
Resourcing level	25	9%

In discussions with Lean consultants, it was noted that staff who attended Lean workshops were early adopters of Lean, even though they were quite sceptical in the

beginning. In contrast, those who did not attend the training workshops took longer to accept Lean.

Question 23: The Lean barriers.

This is similar to identifying Lean barriers. Suspicion of change, a culture who had experienced minimal change considered as barriers (see Table 6.20). With regard to suspicion of change barrier, a consultant (E3) mentioned that:

> *"This was mainly due to the fact that Lean was being implemented at a time of recession and when messages about having resources reduced over time were being given to staff. Staff were also picking up messages on the 'grapevine' about Lean leading to staff reductions in other industry sectors. Although these were never substantiated, they did help to fuel the suspicion".*

However, some respondents replied that not having a training was not an issue but they stressed that commitment from senior management is lacking and that may be a barrier for Lean.

Table 6.20**:** Barriers for Lean implementation

Options	Number of Responses	% of Responses
No change	34	14%
Change suspicion	34	14%
Lack of SM commitment	36	16%
Change Resistance	34	14%
Ownership (lack of)	25	11%
Ineffective communication	18	8%
Accountability (lack of)	14	6%
Under resource	12	5%
No time for change implementation	11	5%
No training	7	3%

*Question 24: Length of implementation phase**.**

It appeared the implementation phase for improvement varied from three months to over three years (see below table 6.21) as some improvements were done in phases.

Table 6.21: Time frame for Lean Implementation

Comment	Number	%
On-going projects	6	30%
About 1 year	6	30%
Different project lengths	3	15%
Between 3 and 6 months	2	10%
Very short – less than 10 weeks	1	5%
Not yet been implemented	2	10%

Question 25: Evaluation approaches.

A number of comments were made at evaluating and listed in Table 6.22. However, in many cases, it identified project success rather than what would be focus for improving services over all. These evaluations were not from the point of improving a service quality but rather focused internally with heavy emphasis on outputs rather than outcomes.

Table 6.22: Evaluation approaches

Comment	Number
Process improvement is monitored/audited	5
Quantitative evaluations and performance indicators	3
Produce conclusions and recommendations	3
Early days for benefits realisation –some projects	2
Demonstrate improvements	2
Highlight lessons learnt	2

Additional comments:

Within the survey a blank space was provided to capture any additional comments respondent wish to record focusing on their experience on Lean. The most comments were on the subject of leadership commitment, performance management and team working and contribution. It was mentioned that Lean had led to improvements but it was highlighted that time and efforts still required to embed the change.

During the discussion, several participants mentioned the subject of rewards. They stated that in some departments, there is an undocumented school of thought that suggests that employees should not be rewarded for doing the work that is expected of them. They went on to say that when employees believe that they are

appropriately rewarded for their efforts, deliverables such as providing positive reinforcement through performance management or reward and recognition systems do not lead to diminished returns. The author prompted a question: *"why then does the airline company continue to have a performance measurement system?"*

One Lean champion responded:

> *"The senior-level employees are awarded with bonuses yet those awards are based on the collective successes of many employees. In reality, our performance management policy should be ensuring that the airline company is aptly recognising employees as individual and team contributors."*

It was observed that while some of leadership's efforts are transparent to lower level employees, there exists a delicate balance between how the airline company functions and the role that leadership plays.

6.5.5.3 R5 Summary

To summarise the findings indicated that all elements identified for employee and operational dimensions are significant towards employee engagement and their satisfaction. The rationale for combining qualitative and quantitative methodologies was to expand on the research so that it could be explored from a variety of sources. This combination created an avenue for diverse perspectives to be explored. This was important because in a purely qualitative or purely quantitative research project, the limitations of the methodology can create barriers by minimising the amount of data that can be triangulated. Positive relationships between employee and operational dimensions towards employee satisfaction have been identified, and these are considered to be essential for the airline company for sustaining commitment for the Lean improvements.

6.6 The Framework – 'Lean appraisal framework'

In this section, the findings collected from the previous three steps of this research study was used for revisit to the framework presented in Figure 6.3. Using literature, revisiting cases and experts' suggestions, each theory elements with their underlying

definitions were refined and validated. The customer and employee value concept were added to enhance the framework and five relationships were established. The Lean principles (as discussed in the Table 2.2) related to each concept are depicted on the revised framework and shown in Figure 6.3. At this point, this framework is branded as 'Lean appraisal framework'.
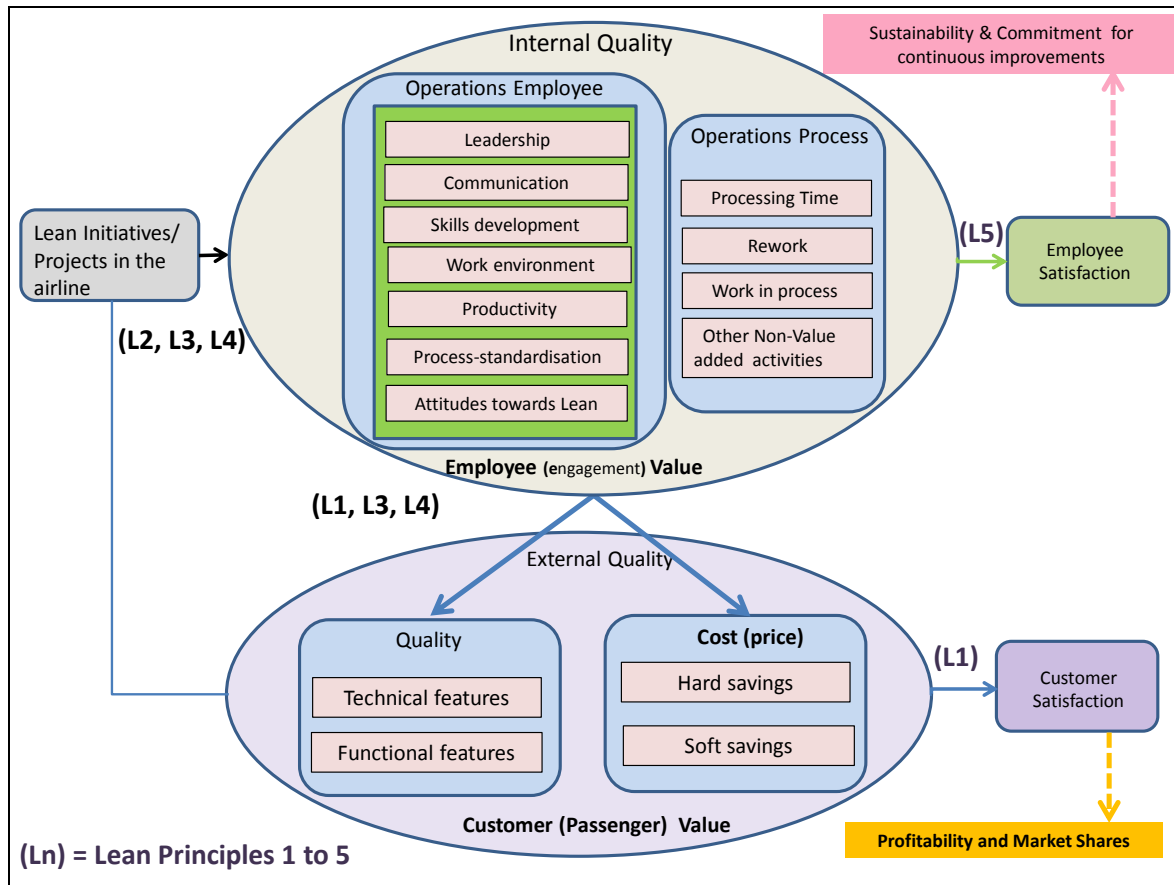
Figure 6.3: The Lean appraisal enhanced framework

Before discussing the framework components in detail, the literature was referenced to make some comparisons and to add context to this framework.

The Lean appraisal framework have some similarities with other framework in the literature. The first similarity is with Brignall and Ballantine, (1996) since the end result is derived from elements and its relationships. Similarly, Brown, (1996) framework provided similarity with an understanding between performance measurement and business views that includes goals, inputs, process, outputs and results. However, there are some similarities with these two frameworks with the

proposed Lean appraisal framework, but the links that identifies relationships between these elements and its importance were absent.

Neely et al. (2000) recommendations to have a balanced view of the business and it should contain efficiency and effectiveness, financial and non-financial measures. The author wants to consider further by taking an operational view of performance and evaluate Lean initiatives at the project-level.

When compared with other performance measurement frameworks, the proposed Lean appraisal framework would acknowledge the relationships between the different dimensions. The framework focus would be on both internal and external measures and would define five key criteria accordingly (internal quality, external quality, cost, customer and employee satisfaction) and that could be used for evaluating the Lean improvement results. These criteria are briefly discussed.

6.6.1 Internal quality dimension

The internal quality dimension (consists of internal operational and internal employee aspects) focuses on recognising the direct results of Lean initiatives and uses measures defined in chapter 5.

The review of literature also identified some claims and suggestions made by the scholars. For example, Neely *et al.* (1995) argued that the internal quality dimension is an important dimension for performance and efficiency. They defined efficiency as how economically the firm's resources are utilised for specific sets of actions and added that improvement in efficiency leads to reduction in cost as well as improving the effectiveness of the business.

In supporting this view, Brown, (1996) suggested to consider internal quality dimension as the prerequisite to the external quality dimension. Brignall and Ballantine, (1996) commented that organisational measures should contain internal and external measures and it should be combined to provide the true value of their service.

Kaplan and Norton, (1992) pointed out that the employee drives the strategic initiative into action and can enable a company to gain a higher profit margin. Brignall and Ballantine, (1996) agreed and added that this aspect can be measured in terms of skills development, work environment, leadership and productivity.

The internal quality dimension in the context of this study indicates its importance and therefore, it is crucial that it is represented in the Lean appraisal framework. It is hoped that it will provide better appreciation of the true value of improvement results for the practitioner, which would be helpful in sustaining improvements effort and achieve long-term profitability. This should support in creating a culture of continuous improvement.

6.6.2 External quality dimension

This dimension provides greater understanding of results that is perceived by customers. From the literature it can be deduced that key measures considered to be technical and functional features. As discussed above that the technical features includes the service attributes, whilst the functional features represent service delivery attributes. Williams and Naumann, (2011) claimed that the external quality dimension supports the perceived quality factors and service delivery process, and considers the quality attributes known as technical features, and functional features.

Review of the literature highlighted that the external quality dimension contains both hard and soft aspects of service quality and relates to effectiveness. Kaplan and Norton, (1992) stressed that the external quality should include both 'hard' and 'soft' service measures since these two aspects combined would provide better understanding in delivering customer value (Kaplan and Norton, 1992).

Brignall and Ballantine, (1996) observed that organisations do focus narrowly on quantifiable results and neglect soft measures such as improved service quality and internal and external customer/employee satisfaction. Neely *et al.* (2000) agreed with this sentiment and reasoned that this is due to the weakness of current performance measurement systems with one dimension view. To consider a multi-dimensional

view, the external quality can become a mediator/arbitrator between Lean improvements and customer satisfaction. The statistical evidence gathered through customer survey underpinned the external quality dimension importance for customer satisfaction. This is supported by Brignall and Ballantine, (1996) who stated that external quality can be measured through customer satisfaction.

6.6.3 Cost dimension

As discussed in section 6.5.3, the customer can perceive the cost dimension or as price or cost reduction. Although Lean initiative results can be related to cost, Keegan *et al.* (1989) argued that a thorough understanding should be gained to base the cost relationships. The cost measures applied in the airline company is reflected as direct and indirect cost savings (converted from elimination of waste) but are not directly linked to cost dimension. For example, the seat design improvement (PA2) highlighted the relationships between Lean improvements and the cost dimension, as shown in Figure 6.5. Another such example, reduced cycle time, this would increase the process efficiency thus reducing the cost. This allows the company to make more profit after cost saving, or pass savings on to customers by offering a reduced price. This means that where value is perceived against quality/cost-price is improved, and that enhances customer satisfaction.
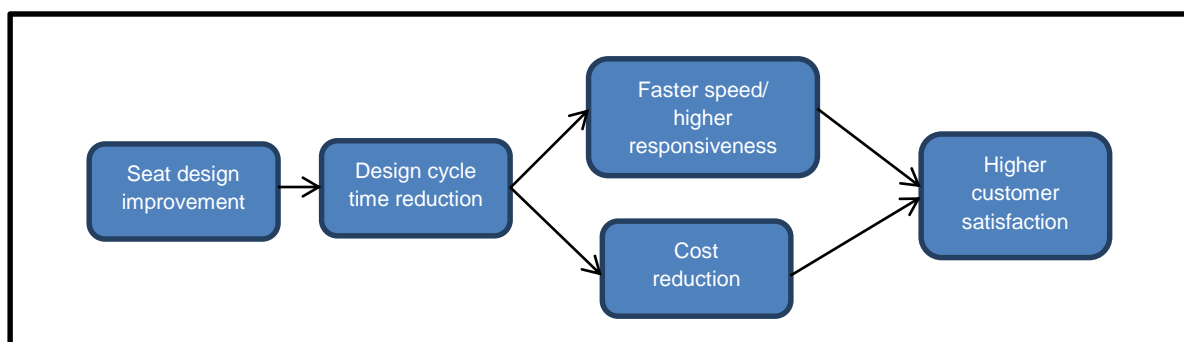
Figure 6.4: The relationship flow leading to customer satisfaction

To conclude, Lean initiatives should focus on the cost drivers and should include cost measures (can be associated with predetermined targets) in simplistic terms so that it can be understood by people who make improvements. This then provides practitioners with greater understanding on cost and resources required for improvement.

6.6.4 Internal-external customer satisfaction

Understanding the internal and external customer satisfaction values should be the ultimate goal of Lean improvements. As discussed in chapter 2 that satisfaction (Internal-external) is based on perception. Customer satisfaction is based on external quality and price of services and it defines customer value. Whilst employee satisfaction is based on operations process and operations employee and it defines employee engagement value. From the evidences it was deduced that the airline company has sought to measure customer satisfaction at the organisational level but no attempts have been made for measuring employee satisfaction through evaluating Lean improvement results.

From the review of the literature it is assumed that the existent performance measurement frameworks provides an importance to measure and this is used to justify strategic actions and turn them into achievements.

As discussed in the previous sections that external quality and cost dimensions provide primary additional value to customers that could be resulted from the Lean improvements. Similarly, internal quality and cost dimensions provide additional value to the improvement initiatives that supports continuous improvement.

Review of literature highlights that employee engagement is important for Lean to success as an improvement strategy, claimed by Salanova, Agut and Peiró, (2005). They explained that engagement can be influenced by factors such as workplace environment, communication, leadership to trust and respect, company standards in procedures, performance. To support this claim, Taborda, (2000). Rother. (2004) and Konrad, (2006) employee engagement can be a deciding factor in Lean adoption and to create a culture for continuous improvement. They stressed that employee engagement can affect productivity and their loyalty to the company which is linked to gaining customer satisfaction for the company's growth and value.

Stoneman, (2013) recommended to measure employee engagement to improve productivity and to meet improvement objectives. He went on to say that regular measures provide appropriate pointers to encourage motivation.

The relationship between two satisfactions (employee and customer) shown in the Lean appraisal framework (Figure 6.4) as a dotted line is complicated by nature. Although the airline service is thought of as a commodity, there are still aspects of price, convenience, and product availability which are outside of employees' control but could impact customer satisfaction. In addition, the airline company involved in this study utilises multiple customer loyalty programs that may impact a customer satisfaction independent of employee satisfaction. These variables, not assessed by the current study and could play a role in the implicit relationship between employee satisfaction and customer satisfaction.

From the above discussions it can be concluded that customer and employee satisfaction have become prominent measures and it provides insight into –operating performance from their perspectives.

In summary, the Lean appraisal framework contains three determinants; quality; cost; and satisfaction (internal – external). From the review of the literature and empirical evidences, it can be deduced that service improvements are not being evaluated considering all three factors.

From the empirical analysis and discussion notes, it appears that there is no tool that is being used to evaluate the results of Lean initiatives (a weakness of the current practice). This raises an important question: how can an organisation evaluate Lean improvement results that includes quality, cost and satisfaction factors?

During the discussions with Lean experts and practitioners, an interest was expressed to develop a tool that can be used to evaluate the Lean improvement results. The author took this request on board and constructed a prototype tool using Microsoft Excel. This tool is named as 'Lean appraisal tool'. The following sections describes how the Lean appraisal tool was developed.

6.7 The construction of the 'Lean appraisal tool'

The empirical findings recorded in Chapter 5 revealed there is a lack of method or a tool in the airline company to evaluate the Lean improvement results. Neely *et al.* (1995) proclaimed that business improvement methods, such as Six Sigma, Lean and TQM, have been criticised because it has an excessive focus on measuring the process, rather than evaluating the results. To further support this claim, Neely *et al.* (1995) pointed out that the outcomes of Lean initiatives are understudied. These scholars highlighted the importance of evaluating the results of improvements using multi-dimensional perspectives. Therefore, this section attempts to address this through exploring ideas taken from performance measurement literature and constructs a prototype tool to evaluate Lean improvement results at the project level.

As can be seen in the Figure 6.4, the Lean appraisal framework focuses on both internal and external measures. Based on the Lean appraisal framework, five key criteria (internal quality, external quality, cost, customer satisfaction, and employee satisfaction) for evaluating the outcomes of Lean adoption were defined. These criteria are now considered together with the identified relationships between the different dimensions.

Through taking in account the theory concepts with the performance measurement literature, which was reviewed in chapter 2 (see section 2.5), and criteria for evaluating projects identified in section 6.3. Using MS Excel, the Lean appraisal tool is constructed in the following section together with step-by-step guidelines (that is stored in Appendix D 1.1).

6.7.1 The Lean appraisal tool

Practitioner interviews identified the importance of having a systematic approach for evaluating improvement through Lean initiatives. This was highlighted as existing evaluation approaches has shortcomings as discussed below:

- No feedback provided in order to sustain a continuous improvement effort

- Heavy emphasis on evaluating the results of improvements using handful of measures – e.g. cost reduction dimension

- Limited considerations for soft aspects of improvements that considers customer and employee perspectives

This clearly demonstrated the practitioners' need for a systematic approach to appraise Lean projects. Hence, the Lean appraisal tool was proposed for the airline company. The criteria identified in the above section were employed to synthesise the Lean appraisal tool. The performance measurement theory was used in context with the review of literature that is recorded in chapter two.

The following are set of measures for evaluating improvement results:

(1) To provide *a balanced picture of the Lean project outcomes*. The evaluation criteria applied in this tool reflects financial and non-financial measures, internal and external measures, as well as efficiency and effectiveness measures.

(2) The tool should reflect *multi-dimensional criteria* that are to evaluating improvement results. Four important criteria are internal quality, external quality, cost, and customer satisfaction. By considering the strengths of the BSC and performance prism approaches, the Lean appraisal tool aimed to provide a firm basis for covering performance and stakeholder perspectives.

(3) To prove that *the results are a function of determinants*. Accordingly, customer and employee satisfaction are considered for Lean adoption, whilst other evaluation criteria (internal quality, external quality, and cost) are viewed as key determinants that drive the true value for enhancing both internal and external customer satisfaction.

(4) Since the proper goal of Lean projects is improving the end-to-end business process, the proposed Lean appraisal framework helps to *portray the integrated picture* and consider relationships between each dimension.

The Lean appraisal tool was therefore synthesised by considering the logical significance of appraisal (evaluation) criteria towards the business process. This view is in line with recommendation made by Brown, (1996).

(5) To provide **comprehensiveness** in understanding project results. Rather than focusing only on efficiency and cost, the proposed Lean appraisal tool also considered subjective measures related to service quality as other important assessment criteria.

(6) To provide **an overview of the overall outcomes/results (of a Lean project** that is easy to understand and ready to apply to an existing situation. This tool will provide practitioners with a broader view to understand the results of projects.

The Lean appraisal tool was principally developed based on the Lean appraisal framework which is described in section 6.2. Taking into account the practitioner point of view, this appraisal tool is simple and uses existing an MS Excel program. The spreadsheet format provides users with a responsive and flexibility with a user-friendly interface. It is hoped that this tool will help practitioners to track the improvement performance and be used to record as statistical evidences. Appendix D contains an example of use of this tool with a step-by-step guideline for using the Lean appraisal tool.

6.8 Summary

This chapter took three actions to construct and refine the framework. First, theory concepts were refined by incorporating experts' comments and suggestions. This required a number of iterations between the literature and empirical evidences. Second, the theory concepts were validated and justified through selecting members from the airline company. Third, the proposed 'customer value' and employee 'engagement value' as mediator(s) between the Lean initiative and customer and employee satisfaction were discussed. These three steps enhanced the underlying concept of the framework and allowed the integration of quality- cost-delivery

dimensions into focus. This provides further understanding of the customer's and employee's perception(s) of the received service that is considered to be an important judgement for their satisfaction.

The 'customer value' and the 'engagement value' were viewed as *mediators* of the Lean improvement initiative between customer and employee satisfaction. These could be considered as *'impact-mediators'*, and *'feedback-mediator'* explaining how the improvement results impacts customer's and employee's perceived value of services. It would identify critical areas for future improvement by considering internal and external customers' needs and expectations.

The departments were revisited to collect further empirical data to increase the reliability of the results. Five relationships were identified, addressing the fourth research objective. These five relationships characterised the outcomes of Lean adoption towards internal and external customer satisfaction. They provided a firm foundation through establishing internal validity.

To pursue the final research objective and further details to answer the research question, the Lean appraisal tool was developed, based on the Lean appraisal framework. The ideas for developing a tool to assist in evaluating results were developed reflecting the Lean appraisal framework against the performance measurement literature.

It is believed that the Lean appraisal tool would aid practitioners in evaluating the outcomes of a Lean project systematically. A step-by-step guideline is also presented (see Appendix D 1.1) to guide the application. This tool has been given to the Lean CI team to use and identify ideas for further fine-tuning. The author is awaiting feedback on the tool, which may require refinement prior to full roll out use to other departments of the case study company.

CHAPTER 7 : DISCUSSIONS AND CONCLUSION

Chapter Six discussed the research findings and presented the Lean appraisal framework based on the analysis of empirical data. The framework elucidated the interaction between Lean improvement initiatives to its results for the UK-based airline company.

This final chapter presents a discussion summary and concludes this research. It discusses an outline of the research findings which is based on the research methodology covered in chapter 4 and underpinned by theory knowledge gained through literature review in chapter 2. It is been noted that evaluation of this research may be deficient due to the timescale. The conclusion is presented prior to discussing the unique contribution and provided recommendations for further work in this field

7.1 Data Analysis

The previous chapters of this dissertation have shown the various facets of Lean and how it has been applied and exemplified with nine cases from a single airline case study company. Chapter six examined how Lean was deployed within the airline company and analysed the data against the central theory. Following on, this chapter discusses the research methodology that captured the case data presented in chapters 5 and 6 and identifies factors that allowed to represent the framework and discuss its validity.

7.2 Overview of the research methodology

This research included nine cases from three departments of the airline company. The case study approach was a primary method to investigate the Lean deployment within the three departments to identify the approach (initiation, execution and evaluation) with associated issues and representation of Lean as a business improvement strategy. This approach has been supported by a number of scholars, (Eisenhardt, 1989; Yin, 2014; Nieto and Perez, 2000;, and Easterby-Smith *et al.*, 2002). These scholars have claimed that the case study approach allows us to gain

an understanding of the undercurrents within a single setting. McCutcheon and Meredith, (1993) and at a later date Rao *et al.* (1999) pointed out that the case study approach as a research strategy, develops theory based on 'real world' data and these conditions are commonly applied for research in the field of operation management (OM). It bridges the gap between management theories and practice (McCutcheon and Meredith, 1993, Rao *et al.,* 1999). Meredith (1998) and Nieto and Perez (2000) claimed that case study clarifies 'how' and 'why' questions and explains the rationale behind the decisions answering why and how questions disclosing the end results.

The research methodology used for this research was an empirical, qualitative data collection approach. It included mainly interview (semi-structured) a survey, as well as company documentation. In total, 35 interviews were held with Lean practitioners and senior managers within A, B and C departments. All interviews were transcribed. Evidence from semi-structured interviews were compared with collected company documents and if any discrepancies found, follow-up meetings were held.

A structured questionnaire developed that included both closed and open-ended questions (220 survey questionnaires) and was used to collect quantitative information for the qualitative analysis. These results were used to supplement and to strength the qualitative data and it improved the reliability and validity of the findings.

7.3 Summary of the research findings

This research delivered the framework that provides an understanding on how Lean improvements initiatives can be linked to service quality results. This framework was named as the Lean appraisal framework which also became a base for a practical Lean appraisal tool. It is hoped that this tool will be useful for practitioners for evaluating the Lean improvement results with ease. To portray the entire research rationally, the key findings are presented based on the following four steps.

7.3.1 Step 1 - Establish the conceptual background

A systematic literature review was the first step that provided a context to the thesis. A cyclic and iterative approach was used to search for the literature. To systemise and organise findings, a mind map technique was applied. This mind map (see figure 2.7) provided a rich picture and a clear focus to the research and was referenced throughout the research.

Review of the literature carried out in this step that provided a theory base for the research. The literature review focus was on three areas: Lean, service quality, and performance measurement. It helped to explore and define the nature and meaning of Lean adoption in various sectors and how it differed on initiation, execution and evaluation of Lean improvements initiatives.

With an aim to address the identified research gaps, service quality principles were identified and studied. This helped to understand the 'soft aspects' of Lean adoption. Furthermore, to understand perceived service quality both internally and externally, the Grönroos's service quality framework was deemed the most appropriate. Performance measurement literature was reviewed to identify different frameworks to shortlist the most appropriate framework for this dissertation. This exercise addressed **the first research objective** that is recorded in chapter one *(Carry out a review and critique the literature and produce a taxonomy of views on Lean and airline services elements).*

Following on from the setting the context of the thesis, the next activity was to develop lines of inquiry that provided research focus. Based on the reviewed literature, five propositions were developed. Through exploring Lean initiatives, service quality attributes and performance framework aspects, a framework was conceptualised in chapter 3. This addressed **the second research objective** that is recorded in chapter one *(Formulate a central theory for the airline company that can serve as a thesis foundation).*

7.3.2 Step 2 – Gather and analyse empirical cases

In this step, **the third and fourth research objectives** *(Develop a research methodology and research design to gather empirical data and to test the central theory)* were addressed. In this step, further exploration within the airline company took place to understand how Lean improvement strategy has been deployed. Three main stages: initiation, execution, and evaluation and the criteria, methods and techniques used at each stage were discussed and then described in section 5.3. The two issues were surfaced: ignoring soft aspects (e.g. employee, customer) and no means for evaluating Lean improvement results. These points appeared to be critical for strengthening the theoretical foundation of Lean adoption for service quality improvements in the airline company. The logical significance in the framework was validated and accordingly, the definition and description of concepts were sharpened. Both internal quality and external quality dimensions were redefined through employing the empirical findings, covered in section 6.2 to 6.4. In order to provide a complete view of the framework, dimensions such as 'quality', 'cost' and 'satisfaction (customer and employee) were added, which is shown in Figure 6.1.

7.3.3 Step 3 – Validate framework

The cases and established five main relationships in the framework were revisited. These were then verified using empirical findings, and described in section 6.5. Explanations on 'why' and 'how' each relationship existed and how it linked *Lean initiative with its results.* Lean appraisal tool based on the criteria identified in the Lean appraisal framework. This **addressed the fourth objective** that is recorded in chapter one and partly addressed the research question. The framework was refined and enhanced through adding the 'customer value' and the 'engagement value' concepts and the emergent relationships were verified. As a result, external quality and cost dimensions were defined as *mediators/arbitrators for understanding the results of the Lean improvements as perceived by customers.* Similarly, operational employee and operations process were identified as *mediators/arbitrators for understanding the results of the Lean improvements as perceived by employees.* At

the end of this step, the framework was refined and labelled as the Lean appraisal framework as illustrated in Figure 6.4.

7.3.4 Step 4 - Develop the Lean appraisal framework and tool

While determining the relationships within the Lean appraisal framework, Lean practitioners indicated the need for developing a practical tool to evaluate the Lean initiative results at the project level. Therfore, the main objective of this final step was to enhance the Lean appraisal framework and construct the Lean appraisal tool based on the framework.

The Lean appraisal tool is designed and developed based on the criteria identified in the Lean appraisal framework. This ***addressed the fifth objective and*** addressed the remainder of the research question that is recorded in chapter one *(Based on the outcome of data analysis, construct the framework that is applicable to the airline company for service quality improvements)*. The literature on the performance measurement frameworks was discussed and described in section 6.7, prior to constructing the tool. The step-by-step guidelines were devised to assist practitioners using this tool (see the Appendix D 1.1). Please note that the Lean appraisal tool was developed as a prototype. The tool is being tested at present and due to the limitation of the time for this research and a number of Lean improvements are still at the execution stage, no feedback is collected. This point will be discussed in section 7.4.

Table 7.1 includes a research objectives, summary of the findings and results which were supported by evidences as discussed in the previous chapters.

Table 7.1: Research objectives, findings and results

Step-1 Establish the conceptual background – meeting objectives 1 and 2		
	• Carry out a review and critique the literature and produce a taxonomy of views on Lean and airline services elements. This will provide background to the research and highlight the gaps within the literature • Identify factors which are based around the concepts of service quality improvements, formulate a central focal theory for the UK airline company that can serve as a thesis foundation.	Review of literature identified Lean and service quality topics primarily and at a later date performance measurement as the 3rd topic relevant for this study. The literature identified the following discussion points on the above topics together with the gaps in the literature for this study; 1. Lean service literature lag behind the Lean manufacturing 2. Limited literature on Lean application in an airline services (focus is limited to application of tools and techniques and it is patchy) 3. Service literature highlighted that service quality comprises of TSQ & FSQ and were considered critical and highlighted that there is a limited research in literature on examining how Lean initiatives affect these two broad dimensions 4. To model service quality dimensions, 2 frameworks were considered (SERQUAL and Grönroos), but both have limitations. However, Grönroos framework is more closely matched to this study 5. In airline services the service provider and receiver are both co-producer and therefore it is difficult to measure service quality improvement delivered as part of Lean initiatives 6. Two frameworks for evaluating service quality improvements were considered – 1) SPC which is a linear in nature and its focus on human relation and marketing, rather than operations. Whilst 2)ROQ supports quality improvement efforts and quantifies in monetary benefits but allows company's to purely focus on bottom line improvements (hard)–ignoring soft benefits. Both of these frameworks places little emphasis on approach for improvements which this author consideres as shortcoming since through the understanding of the approach it takes to make service quality improvements actual ongoing improvements can be made and adobpted as a

		business improvement strategy.
		The above findings created a case to extend this understanding of Lean adoption as a business strategy for airline service organisation. The framework was conceptualised that hypothesised relationships between Lean with its service quality results/outcome that required rigorous testing using empirical data.
Step-2 Gather and analyse empirical cases – meeting objectives 3 and 4		
	• Develop a research methodology and research design to gather empirical data and to test the central theory. • Analyse and test the data with collection of empirical evidence and compare it with the central (focal) theory	In this step, the literature from various author were reviewed and the most suitable research design **an** empirical case study methodology as recommended by Easterby-smith et al. (2002) was considered and planned for this study. This is a multidisciplinary approach as it allows us to reflect on the different aspects of an organisation and it is justifiable since Lean has evolved and borrowed concepts from previous quality improvement approaches, the empirical case study methodology does provide depth and allows us to question the rationality of action through quantitative method whilst the qualitative method provides width and quantifies the opinions/views. Conducted preliminary investigation based on 4 case selection criteria and nine Lean initiative's (miniature cases) were gathered from the three departments of the single airline organisation. The decision was to use both qualitative (Interviews, observations and secondary source of existing documentation) and at a later stage quantitative (survey- questionnaires) as data collection approaches for this research. For storing cases material database and a paper file were considered. 2 data analysis with-in case analysis and cross case analysis techniques were deemed important and it is recommended by various scholars (p96-99). Based on this, the data collection model (figure 4.3) was constructed**.** In addition the reviewed research methodology literature provided a context to the study approach and Research Design Model was constructed which is shown in (figure 4.4**).** This then led to exploration of cases within the case study

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company as chapter 5 of this thesis. The findings were as follows;

- All of these nine cases followed the three stages: initiation, implementation and evaluation as a Lean initiative improvement approach

- The airline focus was on process efficiency and cost savings. Less attention was paid in understanding the results of the Lean improvements and did not consider satisfaction value.

- Identifying differences between 'internal quality' and 'external quality' concept enhanced understanding of Lean initiatives results.

- The 'external quality' and 'price' aspects are considered mediators/arbitrators for understanding Lean results, as perceived by customers.

- The 'internal quality' and 'price' aspect are considered mediators/arbitrators for understanding Lean results, as perceived by employees.

- 'Customer Value' and 'Engagement Value' concepts should be included to appreciate the true value of the Lean initiative

- The logical significance in the framework required refinement in order to understand the Lean results, taking into account factors such as team structure, current working practices

- Through discussion, it was highlighted that the current evaluation approach to Lean results were ineffective since it was not systematic and they were not evaluating Lean initiatives results at project level

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Step-3 Validate theory -– meeting objective 4

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- Analyse and test the data with collection of empirical evidence and compare it with the

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As claimed by Miles and Huberman, (1994), Orosz, Miles and Huberman, (1997) who suggested that to increase the validity of the data, replicated ideas should be regarded significant. The views on external and internal quality dimensions were captured. The framework proposed in

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	central (focal) theory.	(Fig 3.2) was revisited and enhanced (Fig 6.2) with help of expert views. The soft aspects, related to employee and customer, were considered in focus for understanding the value propositions from customer and employee. Five relationships were identified and validated through qualitative and quantitative approaches.
		Relationship 1: *The Lean initiative improves the internal quality dimension*
		Relationship 2: *The internal quality dimension and external quality dimension are linked (*Through initial interviews for data collection it became apparent that there were limited number of people who were available for interviews so the quantitative questionnaire was designed to use as a supplement for the qualitative findings and the link between internal-external quality dimensions relationships were assessed and to record the degree in the relationship – a relationship mapping matrix was constructed using XLS. The data were mapped using different colours on the matrix (Fig 6.3).
		Relationship 3*: The internal quality dimension is linked with the cost/ price dimension*
		Relationship 4: *The external quality and price dimensions are the key arbitrators/mediators between Lean improvements and customer satisfaction (How price as a feature of external quality influences customer satisfaction)*
		* **Relationship 5:** The internal operations process and operations employee dimensions are the key arbitrators/mediators between Lean improvements and employee satisfaction (upon recommendation Emp satisfaction survey designed with 25 Qs. The survey results were shared with two departments.*
		The positive relationships between employee and operational dimensions towards employee satisfaction have been identified, and these are essential for the airline company for sustaining commitment for the Lean improvements.
Step-4 Develop the Lean appraisal framework and tool – meeting objectives 5		

	• Based on the outcome of the data analysis, construct a framework that is relevant to the airline company for appraising service quality improvements.	The findings collected from the previous three steps and was used to revisit the framework presented in (Figure 6.2,). The Lean principles as discussed in chapter 2, (section 2.2.4.1) related to each concepts are depicted on the revised framework and shown in (Figure 6.4). At this point, this framework was named as 'Lean appraisal framework'. The performance measurement literature was revisited and two frameworks (performance prism and performance measurement matrix) were compared. A performance measurement matrix proposed by Keegan et al. (1989) was considered since it appeared as a simple framework, and allows flexibility to record measures. The similarity and differences between the Lean Appraisal Framework with the existing framework was highlighted.

In summary, the Lean appraisal framework contains three determinants; quality; cost; and satisfaction (internal – external). From the review of the literature and empirical evidences, it can be deduced that service improvements are not being evaluated considering all three factors.

Interview with practitioner group suggested a need for a balanced approach for measuring the outcome of Lean improvements. Using Neely et al. (2002) characteristics for developing a set of measures and using the Lean appraisal framework as a foundation, the Lean appraisal tool was developed. This tool is different to existing performance management tools since it evaluates Lean results at project level, enabling key decision makers to provide enhanced understanding on Lean deployment and provide evidences for improvements in service quality to enable further penetration of Lean as a business strategy.

A step-by-step guideline (Appendix D1.1) was also devised on how to use the tool and shared with departments. |

7.4 Comparison with existing framework

In the previous section, Table 7.1 listed a summary lists the four research steps, and explains how the Lean appraisal framework was conceptualised and developed. For illustrating the contribution made by this research into the OM field, but before that the purpose, context and content of the proposed Lean appraisal framework (with comparisons with SPC /ROQ) is discussed. This will answer any raised question that may arise as to whether the proposed Lean appraisal framework is similar to existing frameworks, or can it be considered as new knowledge.

- The Lean appraisal framework explained the relationship between a Lean improvement initiative with its results/outcome (customer and employee satisfaction), and provided a base for evaluating the results. The intention here is not to discuss the effects of service quality improvements on broader terms for the airline company, for example company growth, financial results. Therefore the framework is unlike existing service quality frameworks - SPC and ROQ. Both the SPC and ROQ support an understanding of the cause-and-effect of service quality improvement and considers the business impact such as revenue, market share as a growth. Hence, it is argued that both frameworks do not place significant importance on the specific improvement efforts (i.e. Lean initiatives). This claim is in line with the views of Rust *et al.* 2002, (p.8). It is fair to assume that neither SPC nor ROQ frameworks emphasises on evaluating results of specific improvement initiative. This deemed to be a weakness from this study's point of view, since through evaluating specific improvement initiatives an understanding can be gained on its success or its failure. Hence, the proposed Lean appraisal framework which has a process-improvement focus was developed to capture the impacts of Lean initiatives linking it to its results

- The *context* of the proposed Lean appraisal framework is therefore supports the airline company who is seeking to adopt and evaluate Lean improvements for improving their service quality. In this respect, it is different to the SPC and ROQ frameworks that present a generic evaluation view at the organisational level. The Lean appraisal framework was developed considering the view of the service provider and the perspective of the service receiver. Whilst the focus and

orientation of the SPC frameworks is towards cost, revenue and market share at a high level, these frameworks omit to consider views from either service provider i.e. employee nor service receiver i.e. customer

- The Lean appraisal framework provides a structure, contains theory elements, and the links between theory elements. The purpose and context of the proposed Lean appraisal framework sets the existing frameworks aside. The element of theory was conceptualised and analysed using empirical evidences taken from the UK based airline company rather than abstracted from the literature. Although some elements contain the same or similar terms. However, it is not sourced from existing frameworks. Compared with the SPC framework, the proposed Lean appraisal framework considers 'internal quality', 'external quality', 'employee satisfaction' and 'customer satisfaction' facets. The SPC framework uses the same components but in a different context. Referencing the ROQ framework, the Lean appraisal framework expands the understanding on the issues of making a service quality improvement, perceptions for service quality and employee engagement and satisfaction values for the customer as well as for the employee

- The structure of the Lean appraisal framework was conceptualised and refined. The decision to split internal and external quality dimensions and their measures reflected the airline organisational structure and the split was agreed by them. This is in line with findings of airline services where front and back office operations are separated. The SPC is known to be a linear framework which links business tasks with final results in terms of firm's profitability. The relationships between the theory elements in the Lean appraisal framework was investigated fully and direct and indirect relationships are indicated

- In the literature, a number of scholars have acknowledged that relationships exist between improvement initiatives and improvement results and considers customer satisfaction (see sections 2.3.4 and 2.3.5) with a generic explanation of these relationship(s). But it does not place the emphasis on the service delivery process. However, this author has explained the empirically tested relationships between Lean improvement initiatives to its results. These relationships focus on evaluating the outcomes of improvement initiatives and takes into account both the customer and the employee perspectives. In addition it provided a base for

evaluating Lean results by way of a tool. The Lean appraisal tool is an additional aspect of this research

The above discussions have identified differences in and additions to the proposed Lean appraisal framework from the existing frameworks relating to the research purpose, context and content. The next section discusses the novelty of this research and this study's contributions to knowledge.

7.5 Novelty and Contribution to Knowledge

This research contributes in to the academic field of quality management. The research contributions highlighted in the previous chapter's filling in the literature gaps with identifying the best practices with Lean practitioners.

As it appears that almost 100 years after the first flight took off, it's time to view the airline industry as a mature industry that can use proven practices to improve their service processes and consequently improve their service quality. Lean, adopted by several services that includes hospitals which are also regulated as airlines have confirmed that this methodology is well suited for services. Airlines executives are warming up to this idea and appear to be keen to embark on the Lean journey (MacKenzie-Williams, 2003 and Raghavan and Rhoades, 2008). However, as discussed in the earlier chapters that the academic research that relates to Lean application in the airline services appears to be still limited and patchy. This research's aim is to contribute through filling this gap and extending the knowledge of Lean's adoption as an improvement strategy for an airline sector.

In this study a framework was conceptualised and developed through referencing the service quality principles and empirical evidences. This explained the results of Lean improvements at the project level and considered both customer and employee satisfaction into the evaluation mix, which was considered as a missing element in the Lean literature.

Moreover, the 'customer value' and 'engagement value' concepts were conceptualised and validated to provide a necessary extension to the proposed Lean appraisal framework. It linked both, the customer and the employee perceptions of services with the external and internal dimensions. This has completed the loop in the proposed Lean appraisal framework, and linked both perceptions of the Customer (Passenger) and the Employees.

When the comparison was made with the existing SPC and ROQ frameworks, it revealed that the proposed Lean appraisal framework focuses on a smaller but more intricate context targeted for an airline services. Thus the Lean appraisal framework complements the existing service quality frameworks which have been influential in the service literature.

Having knowledge of how customers and employees perceive the service quality, and being able to evaluate service quality outcome can benefit Lean professionals in quantitative and qualitative ways. The evaluation of service quality can provide specific data that can be used in quality management practices; allowing an airline company to monitor and maintain their service quality improvements. Evaluating service quality improvements with better information on hand on how various dimensions impact overall service quality would enable Lean practitioners' to effectively design and deliver the service quality improvements.

Moreover, the Lean appraisal framework provided a constructive foundation for the Lean appraisal tool. The testing of this prototype tool is currently being undertaken by the airline company, and is waiting for feedback.

7.6 Limitations and Areas for future research

It is acknowleged that there are limitations to this research study that may have affected the extensiveness of the proposed Lean appraisal framework. Also, the Lean appraisal tool is subject to a further enhancement.

Nine cases were taken from the UK based airline company for this research. Therefore a more pressing point is that the number of airline organisations that have

adopted Lean as a business improvement strategy or are going to adopt Lean business strategy in the UK is limited. This could be a limiting factor for generalisation of the concepts within the Lean appraisal framework, to cover all airline services in other country contexts. There exists issues that relate to different country, culture, airline rules regulations specifics to that country, which could limit the acceptability of the proposed framework.

Secondly, time limitation and compromising with work commitments, which is undoubtedly challenging for an independent doctoral study in a full-time employment. The validity and completeness of the Lean appraisal framework might have been addressed and then improved if there were availability of more empirical data. For example, the quantitative data gathered used as supportive evidence but it could have been use to obtain statistical results. Furthermore, within the airline company, the number of available experts were small in number. Therefore, limited expert interviews were conducted.

The Lean appraisal tool based on the Lean appraisal framework was developed at the last stage of the research. Due to time constraints, the testing results and validation feedback is yet to be obtained. The tool is limited to the project-level and has the further limitation on the lack of financial information due to the restriction.

Finally, the current study included data from a single airline company, at a single point in time and primarily from a single geographical location. These limitations lead to questions about generalisability. For example, when data are aggregated at the business unit level, factors in the external environment, such as economic conditions at different regions, could affect customers, employees, or both in ways that might change the proposed relationships between the groups' attitudes. These issues could not be addressed in this study and may be needed for future research.

This study was conducted through selecting and analysing only a handful Lean initiatives. Although there are a high number of Lean projects within the airline company, for this study only a fraction of the improvement projects were selected and analysed in detail. Hence, future improvements could be made by conducting a

wider and deeper analysis with more Lean projects from other departments to explore within the airline.

The conclusions drawn upon the findings are shared with Lean experts. The next step might be to adopt the Lean appraisal framework as a roadmap to evaluate improvement projects with a number of business areas to prove its applicability. However, the current observation is that even though with vision and objectives are defined for the Lean journey, adopting Lean philosophy will require the airline company to tackle more difficult issues such as standardising their processes and changing the role of their frontline managers. This has an impact upon Lean adoption since Lean thinking does require a deep change in operating mentality with a shift in mind-set.

Considering these issues, it could be beneficial to tailor the Lean appraisal framework to suit different departments or roles. In this way, it would require altering the lower details in both the Lean appraisal framework and Lean appraisal tool so that it can be in use.

The study of Lean service quality improvement is both important and challenging. The above limitations suggests four important areas for future research. Firstly, to explore Lean adoption into different countries and services to provide spread and secure the foundation for Lean services theory. This will help to generalise the Lean appraisal framework and to make it more generic for the service sector. Secondly, have a flexibility to add organisation culture and economical contextual aspects to improve the generic nature of the framework. Thirdly, due to the limitation placed for not including any financial information, this added limitations on the scope of the study. A future study should address these limitation by expanding the study scope and through examining the outcomes of Lean initiatives in quantifiable terms (include data on financial performance). Finally, refine, test and validate the proposed Lean appraisal tool. It requires more empirical data and experiments with other services, to provide practitioners a ready-made tool to use for evaluating various types of Lean improvements. To summarise, the proposed Lean appraisal framework together with

an appraisal tool offers a base that can be further developed with qualitative and quantitative empirical data that relates to Lean adoption in services.

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www.shingoprize.org
http://www.industryweek.com/articles

Webminar List at WWW.lean.org

Big Company Disease: What is it? and Why should I care?
Originally presented: January 25, 2011. Viewed on May 25, 2011

On the Mend: Putting culture change at the heart of a lean healthcare transformation
Originally presented: September 13, 2010 Viewed on May 30, 2011

Making Hospitals Work Originally presented: July 30, 2009. Viewed on June 2, 2011

Follow the Learner: The Role of a Leader in Creating a Lean Culture
Originally presented: May 14, 2009. Viewed on June 15, 2011

The Power of Purpose, Process, and People Originally presented: May 1, 2008. Viewed on June 2, 2011

Value Stream Improvement for the Office and Services
Originally presented: August 2, 2007. Viewed on June 16, 2011

Lean Management & the Role of Lean Leadership
Originally presented: October 19, 2006. Viewed on April 28, 2011

APPENDIX – A – LITERATURE MATERIAL

A1.1 The Academic Literature

Through literature review this study has made a number of observation. Firstly, the number of research articles on Lean has grown substantially since the year 1988; and this author believes that this trend will continue since the growing numbers of Lean papers are being presented at top academic conferences. Secondly, a few articles have appeared in the top research journals, including 25 articles in the "*Journal of Operations Management*" (Ahlstrom, Bowen and Youngdahl), and 14 articles in "*Management Science*" (Atkinson, Hendricks and Singhal). The following Table 1 shows the breakdown of articles on Lean by journal.

Table a-1 The number of articles on Lean by journal

Journal Name	Number of Articles
International Journal of Operations Management	25
Research paper	25
Total Quality Management	3
Harvard Business Review	11
Management Science Articles	14
Journals (various disciplines)	15
Quality Progress	3
LEI Report	2
Conference Paper	3
Sloan Management Review	2
Strategic Management Journal	2
The Leadership Quarterly	1
The McKinsey Quarterly	1

Air Transport World	1
Wall Street Journal	1
Others	18
Total	**127**

Thirdly, the focus of Lean has shifted over time. While earlier research focused on technical issues, more recent studies have addressed broader managerial issues such as Project Management, Performance Management as well as much softer elements of Lean such as Respect for People, Leadership behaviors and values.

A1.2 The Practitioner Literature

There are 5,021 books with 'Lean' word in the title (http: //www.amazon.com accessed: 11/08/2011). The following table illustrates a number of books under the specific headings that were referenced during this rigerous literature review. Most of the books can be classified into either Lean basic managerial education or Lean technical tools and techniques.

Table a-2 Lean books

Heading	Number of Books
Lean Manufacturing	2,950
Lean Services	986
Lean Six Sigma	1,787
Lean Management	3,224
Lean Transformation	359
Lean Training	707
Books reviewed for this Literature Review	**47**

In order to obtain the most recent developments in the practitioner's area and to receive regular updates on Lean applications of industry views, 'Google Alert' &

'RSS Feed' on the subject of Lean were created. The alert/feed pointed to some articles on the various websites. A full list of visited websites can be found in the reference section.

A number of webinars held by the Lean Enterprise Institute were attended to enhance understanding and to identify the current trends in applications of Lean in various industries. A full list of webinars can be found in the reference section.

Since 2006, the author has been working as a Lean practitioner, therefore has had privileged first-hand experience of delivering a variety of Lean initiatives. During this engagement and as a benchmarking initiative, a number of companies who have adopted Lean philosophy into their organisation were visited. These visits provided an opportunity to network and form relationship with experts. A numerous expert groups discussions and one to one meetings, with the practitioners from the visited companies; Manufacturing (Porsche), Logistics (Unipart, DHL), Healthcare (Royal Bolton Hospital), and Government Services (HMS) as well as within British Airways were conducted. These discussions have helped to form view from practitioners' point of view and therefore have been included in this document.

In addition, as part of this strudy, a number of 'Process Excellence' seminars were attended and a series of interactive master class sessions delivered by Dr. Steven Spears, Unipart Training Academy, and Porsche Executive Training Sensei attended in order to learn the latest state of the art concepts on the practical elements of Lean.

A1.3 Comparisons of methodologies

The 'Agile' methodology has become the recent improvement methodology. The following table a-1 contains its comparison with Lean.

Table a-3 Comparison of Agile and Lean elements (Source: Tracey (1994))

Agile	Lean
Agile is specific to increasing the speed of application development in software industry.	Lean as a methodology can be used for any industry/ business/ domain.
Agile optimise the current practices with flexible approach and can include other developments	Lean responds to optimising current processes
Agile focus is on the reduction or eliminate variables	Lean focus is on the elimination of wastes
The people are important	The people are important

Putnik (2012), looked at both approach and concluded that the principle aim of Lean is to reduce waste; the principle aim of agile is to satisfy customers. These two concepts are not mutually exclusive, but they are different and the task list to achieve them is different. The key distinction to note is that Lean was conceptualised much before Agile. The literature review has pointed out that Lean has been deployed into a number of sectors hence it has a wider scope and a universal appeal to industry, whilst Agile is used more in software development sector and it also applies a few Lean techniques and tools.

These two popular methodologies are different but its focus is to target for process efficiency and effectiveness to increase customer satisfaction.

The review of literature listed a number of business improvement methodologies which are recorded in the Table a-2. Below Table a-2 provides a summary of comparative views of four business improvement methodologies and reference to the material created by Nave (2002); Anderson *et al.* (2006); Dahlgaard and Dahlgaard-Park (2006) and Putnik (2012).

Table.a-4: The comparison of Business Improvement Methodologies

Methodologies	Origin of methodologies	Underlying theory	Focus	Improvement Approaches	Example Techniques/Tools
Lean	Originated in Japan and named as Toyota Production System (TPM)	Remove non-value added activities Drive Customer value	Focus on flow, eliminate waste and drive for perfection	Identify customer value Value-stream analysis Flow Pull Perfection	Kanban Pull scheduling Kaizen Value-Stream Mapping Single piece flow process TPM SMED
Six Sigma	Originated in Japan and practiced in Motorola	Reduce variation/ no defects	CTQ focus to solve problems	The DMAIC as a main improvement approach - contains five phases	Statistical process control Process Map Measurement system FMEA Root cause analysis Cause and effect diagram Pareto analysis Histogram Benchmarking Brainstorming
TQM	The quality evolution in Japan	Focus on customer	Customer-focused	The improvement approach is based on Deming PDCA cycle	Analytical and statistic tools, quality control tools, management tools Quality function deployment (QFD)
BPR	The movement in West	Business transformation Radical redesign the end-to-end business process Discontinuous thinking	End-to-end cross functional business process	Rethink business process in a cross-functional manner and redesign Put the decision point where the work is performed, build control to the process	Process Map/flow charting Benchmarking Just-in-Time Activity Based Costing (ABC) Supporting IT

A 1.4 Lean tool kit

The following table a-3 lists the most popular tools/techniques that are used in Lean implementation and being used in services.

Table a-5: The Lean Tool Kit

Lean Tool	Description	Explanation
5S	Organise the work area: • Sort (keep only what is needed) • Set In Order (organise items) • Shine (work area to be cleaned) • Standardise • Sustain (apply the standards)	Simple tool – keeps workplace in order – eliminates time waste
Continuous Flow	Work-in-process smoothly flows through production with minimal (or no) buffer, between steps of the process.	Eliminates many forms of waste (e.g. inventory, waiting time, and WIP).
Gemba (The Real Place)	Observe the activities by spending time where real action occurs	Adds to understanding of real-world issues – by first-hand observation and by talking with process executers
Hoshin Kanri (Policy Deployment)	Align the goals (Strategy), with the management plans (Tactics) and the work performed (Action).	Progress towards strategic goals becomes consistent and thorough
Kaizen (Continuous Improvement)	Employees work together to make incremental improvements in their process.	Gathers talents to drive improvements
Root Cause Analysis	A problem solving approach focusing on resolving the root cause of the problem instead of applying quick fixes to symptoms of the problem.	Helps to understand the real problem and defines corrective action
Standard Work	Document working practices – this is a "living" document and must be regularly visited for update.	Brings about consistency and forms a baseline for future improvement activities.
Value Stream Mapping	A technique to map the flow of production process. Shows the current and future state of processes in a way that highlights opportunities for improvement.	Exposes waste in the current processes and creates a roadmap for improvement.

A 1.5 Service quality dimensions

The following table a-4 lists attributes differentiating service quality dimensions.

Table a-6: Service quality dimensions

Internal quality dimension	External quality dimension
Internal conformance	External conformance
Internal service quality Employee satisfaction Employee productivity	External service value Customer satisfaction
Internal focus: conformance of operations process specification (time, rework, WIP) Internal employees' needs must be met Internal efficiency	External focus : both objective and subjective measures are included to understand how customer perceived service quality delivered External effectiveness
Efficiency	Effectiveness
Internal dimension mainly focused on people and process	External dimension is related to both customers, and competitors
Quality performance resulted from business improvement initiative including time, cost, flexibility.	Customer perception of quality performance resulted from BPI/QI initiative This dimension has been found understudied, and needs further empirical study

APPENDIX – B RESEARCH METHODOLOGY PRACTICE

B 1.1 Protocol checklist

The protocol checklist was developed as a guideline for data gathering. Any follow-up actions were recorded in the comments column.

Actions	Completed?	Comments
Gaining access		
Initial meeting with Lean CI Team Manager	√	
Identify possible departments and contact list	√	4 departments identified - one department declined
Organising an intro meeting with department contacts	√	
Preparation		
Contact each department personnel for a meeting date	√	
Design case study questions	√	Do draft version and keep version control
Preliminary enquiry about data availability	√	Meet in person and follow-up with an email
Review case study questions with Dr. Cumming	√	
Conduct a case study		
Arrange an intro meeting to design and agree the schedule for interview	√	
Find out the general background on Lean adoption	√	
Face-to-face meeting	√	
Confirm findings	√	Agreed further Qs will be sent by email, if no response received, I will call them to remind.
Data collection		
Interviews	√	
Surveys	√	
Documentation (e.g. TOR, SM presentation, progress report, PIR)	√	
Archival records - for historic information on the improvements	√	

B 1.2 Interview log

Reference Code: The interviewees are coded in a 'category' and corresponding department

For example;
  SML1 - Senior Manager **(SM)** of the LeanCI team
  SMA1- Senior Manager **(SM)**, at Department A **(A)**, no. **1**
  CA3 - Consultant/Improvement Team Leader **(C)**, at Department A **(A)**, no. **3**
  E1- Expert **(E)**, no.**1 (Experts within organisation)**
  LC4- Lean Champion **(L)**, **at** Department C **(C)**, no. **4**
  OA1- Operations Manager **(O)** at Department A **(A)**, no. **1**
  SA1- Operations Employee/ Staff **(S)** at Department A **(A)**, no.**1**

Preliminary Investigation	
Ref. Code	**Title**
SML1	Lean CI Team Manager
SMA1	Senior Manager
SMB1	Senior Manager
SMC1	Senior Manager
CA3	Improvement Team Leader/ Internal Consultant
Study (1)	
SMA1	Senior Manager
CA1	Change Management Lead
CA2	Six Sigma practitioner
CA3	Change Management Programme Office
CB1	Talent Development Executive
CB2	Green Belt (Lean team)
CB3	Black Belt (Lean team)
SMC1	Senior Manager
CC1	Team Manager
CC2	Process and Architecture Development Department Executive
Expert interviews	
E1	Academic/Counsultant
E2	Consultant
E3	Consultant
E4	Consultant
E5	Academic/Counsultant
E6	Lean CI Manager and Senior Manager
E7	Senior Manager
E8	Consultant
E9	Senior Manager
E10	Senior Manager

Study (2)	
CA3	Change Management Programme Office
CA2	Six Sigma practitioner
CA1	Change Management Lead
CA4	Business Manager
CA5	Portfolio Manager
OA1	Operations Manager
OA2	Operations Manager
SA1	Service Delivery Lead (NA region)
SA2	System Operator Lead
SA3	Commercial Performance Lead
E6	Lean CI Manager
E7	Business Manager
CC3	Infrastructure Engineer
CC5	Area Manager
CC2	Process and Architecture Development Mgr.
CC1	Team Manager
OC1	Operations Manager
OC2	Operations Manager
OC3	Ops Manager Revenue Planning
SC1	Software Engineer
SC2	Business Professional Lead
EB4	IT Provision Team manager
LC2	Delivery Manager (Lean Champion)
LC3	Business Manager (Lean Champion)
OC4	Operations Manager
LC4	Improvement Manager (Lean Champion)
LA2	Product and Service Lead (Lean Champion)
LA3	Portfolio Manager (Lean Champion)
E7	Senior Manager
LC5	Promotional Manager (Regions)
Relationship Investigation Matrix	
OA1	Operations Manager
SC2	Business Professional Lead
LC3	Business Manager
LC4	Improvement Manager
LC5	Promotional Manager (Regions)
E6	Lean CI Manager
CA2	Six Sigma practitioner
E8	Consultant

B 1.3 Semi structured interview questions

Background

1. The main objective(s) of the improvement project:

…………………………………………………………………………………...
2. The rational for initiating the improvement project: (drivers for change)

…………………………………………………………………………………………...
3. What are the criteria used for improvement project selection? Why is it important?

………………………………………………………………………………………….
4. How are project prioritised? Any specific approach/ framework used?

…………………………………………………………………………………………...
5. What is the size of improvement team in the project?

…………………………………………………………………………………………..
6. How the improvement team is structured?

…………………………………………………………………………………………

Lean project

7. How does the Lean project conducted? Please describe the approach

……………………………………………………………………………………………
8. What methods, tools and techniques used?

……………………………………………………………………………………………
9. What's approach for evaluating Lean improvements results? Any measures used – if yes, what are they?

……………………………………………………………………………………………
10. Any evaluative measures used for improvement outcomes – that includes customers' perspective?
    a) If yes, how ……………………………………..
    b) If no, why not………………………………

11. Any evaluative measures used for improvement outcomes – that includes employees' perspective?
    a) If yes, how ……………………………………..
    b) If no, why not ………………………………

12. How do you capture the success of a Lean project? Any criteria used?
……………………………………………………………………………………..

Suggestion and discussion

13. In your opinion, what are the key success factors for Lean improvements?
………………………………………………………………………………….
14. What problems/ issues/ obstacles surfaced during the improvement project? How were they addressed?
………………………………………………………………………………….
15. Any further suggestions?
………………………………………………………………………………….

Pick-ups

- understand the need to improve

- Discuss 5 Lean principles

- Awareness on other methodologies; Six Sigma, BPR, TQM.

- Success factors or barrier to success

- How are staff engaged and at what level, What's impact on team working

- Problems / issues more visible and ownership of problem. Mind-set to solve the

  problem or blame?

- Future for Lean - as a programmes, less important than other methodology?

- What structures in place? Stand-up meetings, SOPs, targets, visual management, problem solving , 5S etc.

B 1.4 Expert interview questions

Expert Interviews (Academician/Professional Consultant/Senior Manager)

Background

1. Basic details

      Name and Job title: …………………………………………………………....

      Position: …………………………………………………………....

      Area of research/expertise: …………………………………...

      Contact details (email): …………………………………….....

2. Existing business/ quality improvement initiatives expertise area

      ---- Six Sigma --- Lean --- TQM ---BPR ---Others……………………….

3. What are the key objective for adopting the Lean or other quality improvement initiatives? How would you prioritise them?

Key Objective of Lean adoption	Priority
To improve service quality	
To enhance the organisation competitiveness	
To reduce cost	
To enhance customer satisfaction	
To improve performance (process/working system)	
To improve the financial performance	
To establish quality building culture	
To develop people	
To engage people	
Others…………	

4. What are the factors for initiating an improvement project?

....

5. What are the drivers for improvement? Please give example(s).

....

6. Any barriers to its success? Please explain the reason(s).

....

The following Qs were used in framework discussion

7. Referencing the Lean appraisal framework, what are your views for a complete picture on Lean adoption for improving service quality? Please specify reasons and examples.
....

8. From your experiences, how does Lean help to improve; customer and cost dimensions? Please specify reasons.
....

9. What criteria for measures should be included in the 'internal dimension'?
....

10. What criteria for measures should be included in the 'external dimension'?
....

11a. How can we enhance the framework, considering customer satisfaction element?
....

11b. How can we enhance the framework, considering employee satisfaction element?
....

More suggestions

12. What are different aspects for employee engagement for the Lean improvements?

13. Why do you think it is important to evaluate the outcomes of the Lean initiative - from customer and employee perspectives?

14. How best to link the operations processes (internal) with customer?

15. How best to evaluate the outcomes of the Lean initiative? Please specify reasons.

16. Do you have any comments and suggestions on the Lean appraisal framework?

B 1.5 Practitioner interview questions

1. Details of the interviewees

  Name: …………………………………………………………....
  Department: ………………………………………………………
  Position: …………………………………………………………....
  Area of expertise: ………………………………………...
  Contact details (email): …………………………………....

2. Existing business/ quality improvement initiatives expertise area

  ---- Six Sigma --- Lean --- TQM   ---BPR --Others……………………….

3. What are the key objective for adopting the Lean or other quality improvement initiatives? How would you prioritise them?

Key Objective of Lean adoption	Priority (1-5)
To improve service quality	
To enhance the organisation competitiveness	
To reduce cost	
To enhance customer satisfaction	
To improve performance (process/working system)	
To improve the financial performance	
To establish quality building culture	
To develop people	
To engage people	
Others…………	

4. What are the factors for initiating an improvement project?
....
5. What are the drivers for improvement? Please give example(s).
....
6. Any barriers to its success? Please explain the reason(s).
....

The following Qs were used in framework discussion

7. Referencing the Lean appraisal framework, what are your views for a complete picture on Lean adoption for improving service quality? Please specify reasons and examples.

....

8. From your experiences, how does Lean help to improve; customer and cost dimensions? Please specify reasons.

....

9. What criteria for measures should be included in the 'internal dimension'?

....

10. What criteria for measures should be included in the 'external dimension'?

....

11a. How can we enhance the framework, considering customer satisfaction element?

....

11b. How can we enhance the framework, considering employee satisfaction element?

....

More suggestions

12. What are different aspects for employee engagement for the Lean improvements?

13. Why do you think it is important to evaluate the outcomes of the Lean initiative - from customer and employee perspectives?

14. How best to link the operations processes (internal) with customer?

15. How best to evaluate the outcomes of the Lean initiative? Please specify reasons.

16. Do you have any comments and suggestions on the Lean appraisal framework?

B 1.6 Sales Manager & Contact Employees survey questionnaire

Questionnaire to Sales Area Manager, Contact Employees

The objective of this questionnaire is to understand your perceptions on the Lean business strategy.

1. How does Lean help to improve efficiency and effectiveness of business processes? Please specify the reasons and examples.

....
2. In your opinion improving internal operations processes has impact on the end customers? Please specify reasons and examples.

....
3. How do you evaluate whether customer satisfaction is enhanced after the improvement initiatives?

....
4. Please scale the importance of Lean initiative for the following dimensions.

Quality Dimensions	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
Technical features of services							
Accuracy of services							
Speed of services							
Flexibility of services							
Reliability							
The improved operational processes facilitates work to deliver promises to customer							
The improved operational processes handles customers' problem and provide services right at the first time							
The improved operational processes allows tasks to be completed on time without any errors							
Responsiveness							
The improved operational processes provides prompt service to customer							
The improved operational processes increases willingness to help customer							
The improved operational processes increases the responsiveness to customer request							
Assurance							
The improved operational processes instils customer confidence							
The improved operational processes provides safe transaction to customer.							
The improved operational processes increases consistency courteousness to customer, and provide a knowledge to answer							

customers' questions							
Empathy							
The improved operational processes helps to pay attention to individual customer.							
The improved operational processes considers customer at heart of the operations and understands their specific needs							
The improved operational processes increases customer attention							
Tangibles							
After implementation of Improvement initiatives, gathering information through on-line channel becomes easier and improves visual representation.							
After implementation of Improvement initiatives, customer contact employees have better experience.							

B 1.7 Customer survey questionnaire

The objective of this questionnaire is to understand the perceptions on the service quality improvements. How would you rate the service quality provided by the airline company in the following areas?

Service Quality Dimensions	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
Technical features							
Accuracy of service product – e.g. ticket information/arrival-departure flight information							
Speed of service product - e.g. check-in processing/ refunds/upgrade							
Flexibility of service product - e.g. customise to suit the need							
Reliability							
Provide service as promised (e.g. call back)							
Provide information on change or progress of transactions							
Provide error-free transaction							
Handle queries and answers promptly							
Responsiveness							
Willingness to help							
Responsiveness to request – follow up							
Provide service with speed and efficiency							
Available to answer questions							
Assurance							
Process transaction adhere to confidentiality							
Have knowledge to answer enquiries							
Politeness of courteousness							
Trustworthiness							
Empathy							
Attentiveness to booking needs							
Recognise you as a member (as per tier)							
Available to help and answer your questions							
Friendliness and caring							
Tangibles							
Attractive facilities (Appearance, convenient, cleanliness)							
Modern-looking equipment (e.g. on-line check-in machine)							
The neat appearance of customer contact staff							
Document and material associated with service							

(etkt receipt, PNR)							
Price of service							
Fee/ Charge per ticket transaction							
Ticket rate compared with other airlines							

B 1.8 Lean assessment questionnaire

Questionnaire to Employee

This purpose of this questionnaire to collect your views and comments on your experience on the Lean improvement project. Please complete all questions and statements from your own individual perspective. Please use the scale and choices provided below.

No	Employee Engagement	Strongly Disagree						Strongly Agree
		1	2	3	4	5	6	7
1.	There is a link between the Lean approach and the long term strategic direction of the company							
2.	The Lean Team provide support for implementing the Lean initiative							
3.	Communication about the Lean business strategy has been good.							
4.	There is an awareness of the impact of the Lean business strategy							
5.	Lean as an improvement methodology is suitable to our organisation							
6.	The tools and techniques covered in the Lean training were new to me							
7.	The tools and techniques learnt on the Lean training were used to implement the Lean initiative							
8.	Implementing the Lean business strategy has been more problematic than it was anticipated							
9.	Through adoption of Lean business strategy senior managers show their commitment for increasing performance.							
10.	As a result of Lean business strategy, staff are focusing on improving the cross functional processes.							
11.	The Lean business strategy has enabled the department to meet customer requirements better							
12.	Lean business strategy has enabled the department to match resources to workload better.							
13.	There is scope for spreading Lean strategy in other departments.							
14.	Current working practices implemented through the Lean business strategy will not be sustained beyond 12 months without further support from Lean change agents.							
15.	Current working practices implemented through the Lean business strategy will not be sustained over the longer term unless the Lean continues beyond 2014.							

Question -16: The key principles of Lean you have applied are: *(Please select all options that apply)*

Efficiency ☐ Problem Solving ☐ Value Stream ☐ Flow ☐ Right first time ☐

Pull ☐ Standardising ☐ Customer Value ☐ Remove Waste ☐ Streamlining ☐

Please use provide additional comments on your experience, e.g. positive experiences or problems you have encountered, specific impacts you feel are important or how you feel the outcomes brought about by the Lean business strategy will be sustained over the longer term.

Question -17: What strategies have been used to involve employee engagement?

Question -18: In general, how successful Lean business strategy as a driver for employee engagement?

Question -19: What have been the factors contributing to the success of the Lean initiative?

Question -20: What proportion of your department has been involved in the Lean improvements?

Question -21: Implementing the Lean business strategy in the department has led to: *(Please select all options that apply)*

Achieving team targets more ☐ Better quality of work ☐ Reduce backlogs ☐

Highlight poor performance ☐ Less stressed staff ☐ More efficient process ☐

More efficient process ☐ More motivated staff ☐ Releasing capacity ☐

Better team working ☐ Increased productivity ☐ less time being wasted ☐

More job satisfaction ☐ Reduced errors ☐ Senior staff more visible ☐

Collaborative problem solving ☐ Recognition of good performance ☐

Better working environment ☐

Question -22: The main reasons for achieving success in the elements outlined above have been: *(Please select all options that apply)*

Adequate resource committed ☐ Commitment from senior management ☐

Bottom to top ownership of change ☐ Good communication ☐

Implementing quick wins ☐ Involvement of relevant staff ☐

Provision of relevant training ☐ Hands on approach to change ☐

Question -23: The reasons for any problems encountered have been:

Culture of no change ☐   Lack of accountability ☐   Lack of resource ☐

Lack of ownership ☐   Lack of Training ☐   suspicion of change ☐

Staff resistance ☐   Little time allowed for implementation ☐

Poor communication ☐   Lack of Senior management commitment ☐

Question -24: How long was the implementation phase of the project?

Question -25: Has there been any evaluation of the impact of the Lean business strategy? If so, please provide a brief summary.

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE
YOUR VIEWS ARE IMPORTANT AND WILL REMAIN CONFIDENTIAL

B 1.9 Cast study database

Case Study - PA1 – eTicket Refund Process

Background: When a customer wants a refund they can contact the company in a number of ways. That is directly to Refunds (50% of refund requests), through Customer Relations (20%) and via UK travel agents and OS stations. Whilst the process does work to a degree there are a number of issues with it. The workflow is complex as Customer Relations and Refunds Department use different systems. There are multiple parties involved in the 'pass-on' process and there is no acknowledgement process and once handed to Refunds CR agents do not have visibility of the status of the claim. This issue was highlighted within the latest CRM scores and in addition the Customer Complaints audit raised concern about the ownership and accountability of the end-to-end compensation process.

Project Objectives

- To streamline the existing process (or design a new process if required) between CR and Refunds that will improve the end-to-end turnaround time for customer complaint handling.
- To identify opportunities to improve visibility and transparency of the status of the claim and the methods of communication between the key stakeholders.

Explanations of measurement terms:

The three key measurements targets were used:

1) Flow time (time taken for the refund request to go from initial contact to the refund Department to receiving the payment),

2) Touch time (the time taken on some activities on the refund request)

3) Number of steps that were being carried out by the staff from processing to making the payment.

Steps:

- AS-IS process workshop – 1 Day

- Observation – Go-Look and See and collect data

- Waste analysis and current measures

- Define future process and targets

- Implementation changes and measures

Results:

Measurement	At Start	Target % Chg.	Target	At End	Actual % Chg.
Flow Time	140 min	55%	67.5 min	70min	47%
Manual Time	97 min	26%	74min	52 min	48%
Steps	82	30%	65	18	75%

Other improvements that were reported: value-stream mapping exercise identified four minor process improvements, time reduced for transportation and minimised document hand-offs from 23 to 14.

Case Study - PA2 – CSP process improvement

Background: During a disruption period there is always a need for extra staff to help and support customers at the airports. The company have a Customer Service Programme (CSP), which has been in operation for a number of years, and the CSP is initiated when disruption occurs and shuts down when business returns to normal. The programme uses an online booking tool to book shifts and employee around the company volunteer to support. Employee is offered time in lieu for this service.

The following were a key problems highlighted from the previous CSP attempts;

1) Lack of confirmation of whether required after volunteering

2) Not enough flexibility for staff who what to help out but cannot do long shifts

3) Do not have accurate information about disruption and returning back to normal

4) Mayhem - no protocol for situation

5) There are different messages for different customers at different times

Project Objectives

- To identify opportunities to improve the flow and improve communication between the key stakeholders

- Improve use of IT tool and reporting

Steps:

- Problems/issue gathering workshop
- Collect data and evidences
- Problem solving workshop
- Solution generation and selecting option
- Implementation changes and measures

Results:

The result enabled additional workload carried out with existing resource.

Improves reporting with the use of CSP tool, adequate training was provided. The last CSP programme feedback reported significant improvements in activation process and less chaotic on the shift.

People who worked on this initiative were set up nominally in teams, which meant that the work allocation was easier and the team felt that workload variation was even.

Case Study - PA3 –Customer Service Recovery Process improvement

Background: Through the summer months of July, August and September in line with the roll out of the new system on board, there was significant increase in upgrade failures. This lead to backlogs off over 3000 Proactive which customer relations were unable to respond to quickly back to the customer. Over the months of September and October alone approx. 11k proactive was issued for system failure alone to compensate premium passengers.

Project Objectives

- To restore customers' confidence in and affinity to the Brand and to ensure that they buy with us again through delivering excellent customer service.
- To resolve service failures experienced on board.
- To address service failures which have occurred on board or on the ground and cannot be resolved on board.

- To provide tools to empower and inspire SCCMs to feel more engaged as leaders

- To offer an appropriate level of differentiated service recovery for all passenger types.

- To introduce proactive service recovery at point of failure and allow colleagues to offer First Contact Resolution

Steps:

- Problem definition

- Collect data and evidences

- End to end process mapping

- Waste analysis and problem solving sessions

- Implementation changes and measures

Results:

- Customer Satisfaction – the premium passenger is recognised immediately on board at point of failure, leading to higher levels of customer resolution, The recent survey indicated satisfaction up by 4%

- Crew Satisfaction – gives the crew a tool to help them mitigate the situation on a full system failure

- Process / Cost Savings – Simplification of the process, speed of resolution should prevent complaints coming into CR

- The short term revised process cut the time taken to complete a Proactive from 5 minutes to 1 minute. This is approx. 5 - 7 hours per full system failure to 1 hour.

- Reduced Rejections through UKD – 20% of current Proactive forms cannot be processed due to the completion of the original form. On board recovery removes this and the re design on the Proactive form for economy passengers should reduce this by 50%

Case Study - PB1 New Starter IT Provision Process redesign

Background: The 'Request Fulfilment' process for the new joiners has not been meeting customers' and Business Control's CTQ of having Kit and system access delivered on time and to system specification, through a clear and visible process, with adequate security controls thereby generating unproductive time and frustration for the new starters. The Customer Satisfaction target to be reviewed and refined in light of a survey. The survey results determine the satisfaction levels and set targets accordingly.

Project Objectives

- To provide a channel for managers to request and receive standard services for which a pre-defined approval to their new starters
- To provide information about the availability of services and the procedure for obtaining them
- To source and deliver the components of requested standard services (e.g. licences and software media)
- To assist with general information, complaints or comments

Steps:

- Scope and plan the project, identify key stakeholders and agree terms of reference
- Map AS-IS process
- Collect metrics i.e. Customer Satisfaction, delivery rates of various IT Services i.e. phone, desktop, etc.
- Review and Refine the current state, Identify Future State and produce Change plan
  - o Agreed through engagement with the relevant parties to flesh out what actually happens today.
  - o Wastes identified and the need for change agreed upon
  - o Stakeholder analysis conducted

- The Project Team will design the new process by considering the learnings from stage 2.

- o The intention is to use a Lean approach and it is anticipated that this will require x workshops or other engagement approach agreed with Sponsor.

- Deliver the changes
  1. A Strategic Design Review document will be created to illustrate what needs to be changed to create the new process.
     a. By walking the managers through this document, their buy in will be sought.
     b. Once there is agreement about what needs to change the focus can shift to how the changes should be made, and the signed off Strategic Design Review document is subject to change control.
     c. The outcomes will be communicated to all of those involved in the process.
     d. Finally, the new process will be implemented, following process trials if appropriate.
     e. Complete a review of how the new process performed, look for ways to improve upon it.

Results:

Provided a quick and effective access to standard services which new joiners and others can use to improve their productivity or the quality of business services and products. Also reduced the bureaucracy involved in requesting and receiving access to existing or new services, thus reduced the cost of providing these services. Centralising the process also increased the level of control over these services.

Within 6 months of implementing the revised process, Customer Satisfaction(measuring time and delivery to spec. of basic IT Provision) for those starting new job and their managers was achieved at 80% (satisfied or very satisfied).

Case Study - PB2 Leadership Development

Background: The Senior Management team of the Department devised a vision; 'to become an employer of choice with a strong differentiating employer brand and

boost performance on internal metrics including: employee engagement, retention, advocacy, productivity & wellbeing'. Their business objectives were to align their human resource processes and communications campaign to enable the unique resource proposition at the heart of the business. They identified 'Leadership Development' initiative as the first initiative to apply Lean. The initiative had three drivers for change; A) Business plan alignment; B) Succession Plan needs; C) External trends in development solutions.

Project Objectives

- Review the Leadership design and development process with a view enhancing the quality of the process output and obtaining a common process
- Establish an environment of Continuous Improvement(CI) to adapt to business needs and adopt best practice

Steps:

1) Needs analysis and what do we have and what's out there
2) Scoping and Prioritisation
3) Design and Communicate
4) Deliver -> Pilot -> Rollout
5) Evaluation and any refinements

Results:

- Single process agreed by all. This will provide a consistent approach for leadership development across the company and identified a number of quick wins to simplify the process further
- Opportunity identified to increase ROI through sharing of knowledge
- Built-in contingency of data and its reporting
- Findings facilitated an open and honest discussions on key areas for CI

Case Study - PC1 Customer Focussed Selling Process Redesign

Background: Customer Focussed Selling was a Commercial project, seeking to improve the organisation capability to offer tactical promotions, either at targeted groups of registered customers or mass market. There were two streams of work within the project; capability and exploitation. The capability stream to deliver online and offline solutions, such as offering vouchers or '2 for the price of 1' deals through the company's website with support from the contact centres. The exploitation stream to define the proposition for such vouchers and had to consider the end-to-end tactical promotions process, from set-up offer to review success of campaign.

Project Objective

- Define a new process which enables speed to market of tactical promotions enabling the organisation to maximise short-term revenue and acquire new customers.

Steps:

1) Map the current promotions process and capture data to understand where there are bottlenecks and wastes, through engaging a cross-functional team from the key stakeholder groups.

2) Agree a set of targets and measures for tactical promotions deploying the new capability.

3) Map the future process to identify quick-wins in improving the end to end process. Carry out more detailed analysis of the most wasteful activities within the process, to reduce the lead-time for setting up tactical promos

4) Work with the business to agree who should be responsible for each step in the process and define clear accountabilities within the process

5) Define the business change plan to document the process and organisation changes and agree owners

Results:

Delivered a sustainable voucher process that was implemented after the agile project completed. The new process enabled tactical voucher promotions with speed to market and enabled the company to maximise short-term revenue and assisted to acquire new customers. The new process removed the wastes from the Campaign set up activities

Case Study - PC2 Multi channel sell and service process improvement

Background: The objective of this project was to define and implement a step change in the way changes are made to multi-channel sell platform, to achieve a quicker and cheaper rate of change whilst maintaining the overall quality. This was split into 3 sequential phases:

1. Preparation
2. Planning
3. Delivery

The scope covered both 'business change' (e.g. organisational, working practices, governance, accountability) and 'technical change' (e.g. delivery methodology, architecture, infrastructure, technology).

It has been acknowledged that the current organisational framework and associated processes around the channel platform is not conducive to working in an agile way. In addition, as new approaches/capabilities to manage technology (e.g. Service Orientated Architecture, 'Agile') mature, it is clear that in order to achieve the step change, fundamental 'business change' will be required to exploit the opportunities the technology offers.

Project Objective

The 'Define the Long Term Vision' stream sits within the preparation phase and is the work required to define the 'business change', underpinned by best practice, required to support the overall delivery of the project objectives

Steps:

1) Information Gathering
2) Information assessment and Recommendation
3) Define the optimum future process
4) Identify opportunities for step change improvements
5) Deliver -> Pilot -> Rollout

Results:

- A set of recommendations/options were presented to the Steering Group for the business change required to achieve the full potential of the Vision
- The recommendations were fed into the planning phase of the project to support the definition of the transition plan
- Project has established and implemented the technical and business elements required to achieve a quicker and cheaper rate of change on a multichannel platform
- The technical change required addressed the new Service Orientated architecture and supported Agile development approach
- Process Design supported definition of the multi-channel platform business framework, which is designed to exploit the opportunities the technology offers

Case Study - PC3 Online Campaign Process Review

Background: The Department is delivering value through supporting an on-line campaign activity (250 campaigns every year), however: delivering an on-line campaign successfully is complex and our approach makes it difficult. The process needs resources from many parts of the organisation but no-one is accountable end-to-end. Additionally the process cannot be repeated as it is not standardised; it is inefficient and error prone with many points of failure – "there is always something that breaks". Hence, we are under-utilising the potential power of on-line marketing.

Everyone tries hard to make each campaign work, and most do. Too much reliance on goodwill and favours and not enough team work

Project Objective

- Identify bottlenecks and improve change cycle times by 75%
- Enhance cross-functional team working
- Implement systematic metrics reporting for embedding continuous improvement

Steps:

1) Map in detail the end-to-end process currently in place for handling online campaigns and promotions
2) Define the optimum future process, including "quick fixes" where feasible
3) Identify opportunities for step change improvements in email marketing capability linking strongly with   e-Dialog work
4) Deliver -> Pilot -> Rollout

Results:

The process review identified more collaboration opportunities. We ran more structured workshops and as a result we have eliminated wastes such as over production of documents, excessive handover and wait time for approvals. Process trialled and fine-tuned after 3 months and it has been now rolled out. By integrating data and processes into a single consistent campaign promotion delivered the followings;

- 12% reduction in cost
- 10% increase in sales volume
- Average CPSc have fallen by 16%
- 20% increase in ROAs

As part of supporting CI, we put up a continuous improvement board in the team workspace covering:

a) key measures relevant to the team's activities

b) 'problem of the week' – invite suggestions for improvements

c) space for other brainwaves feed all the ideas into the weekly process half-day and keep a mini change plan going – feedback to the originators of the ideas on what's happening

Case Study: PC4 Tactical Promotion Process Review

Background: Operational Research Department made an attempt to improve the way in which the tactical campaigns ran in the previous two years campaign. This was only partially successful and although useful progress was made (e.g. more involvement from the team), there was plenty of scope for further improvements. Following a wash-up session on the above work it was decided that the current process was still; undocumented, variable across different teams, potentially inefficient, lack timescales and responsibilities and possibly misses opportunities.

Project Objective

- Understand how the process runs at present and agree need for change
- Design a new process eliminating waste and resolve conflicts
- Bring synergy into teams with a single process

Steps:

1) Health check and scoping
2) Identifying the 'as is' process
3) Designing the 'to be' process
4) Implementation

Results:

Simpler, quicker and more efficient process that now has:

- Less re-working
- Reduced cycle times
- Clear accountabilities

- Fewer errors, including not forgetting to carry out some tasks
- Better communications
- Documented and agreed process used for training and induction and has one standard approach across the team

Improved revenue performance:

- Better mix – improved targeting and control of trade up
- Routes held out of campaign where their inclusion would be delusion

B1.10 Case study summary

Project Reference	Problem	Approach	Tools, Techniques and Systems
	Case Study - A		
PA1 – eTicket Refund Process	When a customer wants a refund they can contact the company in a number of ways. That is directly to Refunds (50% of refund requests), through Customer Relations (20%) and via UK travel agents and OS stations. Whilst the process does work to a degree there are a number of issues with it. The workflow is complex as Customer Relations and Refunds Department use different systems. There are multiple parties involved in the 'pass-on' process and there is no acknowledgement process and once handed to Refunds CR agents do not have visibility of the status of the claim. This issue was highlighted within the latest CRM scores and in addition the Customer Complaints audit raised concern about the ownership and accountability of the end to end compensation process.	1) Shape and Define 2) Measure 3) Analyse 4) Implement 5) Monitor	• Customer surveys • Standard operating procedures (SOP) • Tools of quality (i.e. pareto charts, storyboarding, cause-and-effect diagrams, 5-whys, problem-solving techniques (3Cs)) Process mapping • Production control boards Visual management • 5S methodology Theory of constraints – managing bottlenecks
PA2 – CSP process improvement	During a disruption period there is always a need for extra staff to help and support customers at the airports. The company have a Customer Service Programme (CSP) which has been in operation for a number of years and the CSP is initiated when disruption occurs and shuts down when business returns to normal. The programme uses an online booking tool to book shifts and employee around the company volunteer to support. Employee is offered time in lieu for this service. The following were a key problems highlighted from the previous CSP attempts; 1)Lack of confirmation of whether required after volunteering 2) Not enough flexibility for staff who	1) Shape and Define 2) Measure 3) Analyse 4) Implement 5) Monitor	• Customer surveys Process mapping • Standard operating procedures (SOP) • cause-and-effect diagrams, 5-whys Visual management • 5S methodology Theory of constraints – managing bottlenecks Roles and Responsibility Grid Daily management

	what to help out but cannot do long shifts 3) Do not have accurate information about disruption and returning back to normal 4) Mayhem - no protocol for situation 5) There are different messages for different customers at different times		standard work sheets Spaghetti diagrams
PA3 – Customer Service Recovery Process improvement	Through the summer months of July, August and September in line with the roll out of the new system on board, there was significant increase in upgrade failures. This lead to backlogs off over 3000 Proactive which customer relations were unable to respond to quickly back to the customer. Over the months of September and October alone approx. 11k proactive was issued for system failure alone to compensate premium passengers.	1) Shape and Define 2) Measure 3) Analyse 4) Implement 5) Monitor	Error proofing/zero defects Theory of constraints – managing bottlenecks Process mapping - waste analysis, Problem Solving
	Case Study- B		
PB1 New Starter IT Provision Process redesign	The 'Request Fulfilment' process for the new joiners has not been meeting customers' and Business Control's CTQ of having Kit and system access delivered on time and to system specification, through a clear and visible process, with adequate security controls thereby generating unproductive time and frustration. The Customer Satisfaction target to be reviewed and refined in light of a survey. The survey results determine the satisfaction levels and set targets accordingly.	1) Identify VOC /VOE 2) Measure gap 3) Define solutions 4)Select solution 5) Maintain performance	Voice of the customer/Employee • Strategy deployment • Visual management • Management reporting Problem Solving Process mapping • Score cards • All employee meetings • Surveys

PB2 Leadership Development	The Senior Management team of the Department devised a vision; 'to become an employer of choice with a strong differentiating employer brand and boost performance on internal metrics including: employee engagement, retention, advocacy, productivity &wellbeing'. Their business objectives were to align their human resource processes and communications campaign to enable the unique resource proposition at the heart of the business. They identified 'Leadership Development' initiative as the first initiative to apply Lean. The initiative had three drivers for change; A) Business plan alignment; B) Succession Plan needs; C) External trends in development solutions.	1) Identify VOC /VOE 2) Measure gap 3) Define solutions 4)Select solution 5) Maintain performance	• Mission statement • Vision statement • Goals • Values • Business frameworks Process mapping
	Case Study - C		
PC1 Customer Focussed Selling Process Redesign	Customer Focussed Selling was a Commercial project, seeking to improve the organisation capability to offer tactical promotions, either at targeted groups of registered customers or mass market. There were two streams of work within the project; capability and exploitation. The capability stream to deliver online and offline solutions, such as offering vouchers or '2 for the price of 1' deals through the company's website with support from the contact centres. The exploitation stream to define the proposition for such vouchers and had to consider the end-to-end tactical promotions process, from set-up offer to review success of campaign.	1) Define 2) Measure 3) Analyse 4) Improve 5) Control	• Problem-solving (A3 Thinking, PDCA,DMAIC) • Value stream analysis • Visual management
PC2 Multi channel sell and service process improvement	The objective of this project was to define and implement a step change in the way changes are made to multi-channel sell platform, to achieve a quicker and cheaper rate of change whilst maintaining the overall quality. This was split into 3 sequential phases: 1.Preparation 2.Planning 3.Delivery	1) Define 2) Measure 3) Analyse 4) Improve 5) Control	Error proofing/zero defects • New market development and current market exploitation Theory of constraints – managing

			bottlenecks
	The scope covered both 'business change' (e.g. organisational, working practices, governance, and accountability) and 'technical change' (e.g. delivery methodology, architecture, infrastructure, technology). It has been acknowledged that the current organisational framework and associated processes around the channel platform is not conducive to working in an agile way. In addition, as new approaches/capabilities to manage technology (e.g. Service Orientated Architecture, 'Agile') mature, it is clear that in order to achieve the step change, fundamental 'business change' will be required to exploit the opportunities the technology offers.		
PC3 Online Campaign Process Review	The Department is delivering value through supporting an on-line campaign activity (250 campaigns every year), however: delivering an on-line campaign successfully is complex and our approach makes it difficult. The process needs resources from many parts of the organisation but no-one is accountable end-to-end. Additionally the process cannot be repeated as it is not standardised; it is inefficient and error prone with many points of failure – "there is always something that breaks". Hence, we are under-utilising the potential power of on-line marketing. Everyone tries hard to make each campaign work, and most do. Too much reliance on goodwill and favours and not enough team work	1) Define 2) Measure 3) Analyse 4) Improve 5) Control	Process mapping • Market share analysis Problem Solving Benchmarking • Customer surveys • Field performance data
PC4 Tactical Promotion Process Review	Operational Research Department made an attempt to improve the way in which the tactical campaigns ran in the previous two years campaign. This was only partially successful and although useful progress was made (e.g. more involvement from the team. Following a wash-up session, it was decided that the current process was still; undocumented, inconsistent, and inefficient, lack timescales and missed opportunities.	1) Define 2) Measure 3) Analyse 4) Improve 5) Control	Process mapping • Market share • Customer surveys • Field performance data Problem Solving

B 1.10 The relationship investigation matrix

Objective: This matrix is to determine the degree of relationship between internal quality and external quality dimension.

Instruction: Record the score of each relationship based on perspective and experience. See score definitions as below.

Section III: The relationship investigation matrix (senior executive, operations manager)
Objective: This matrix is developed for investigating the degree of relationship between internal quality and external quality dimension.

Instruction: Please identify the score of each relationship based on your perspective and experience. Give score definitions are provided below.

The causal relationship investigation matrix

Score Definition:
0 represents the re is no relationship
1 represents the weak relationship
2 represents the strong relationship
3 represents the very strong relationship

			Internal Quality										
			Operational Dimension				Employee Dimension						
			Processing Time	Work in process	No of Rework	Non-value added/wastes	Attitudes towards Lean	Communication	Skills development	Leadership	Work environment	Process Standardisation	Productivity
External Quality	Technical features	Accuracy of service											
		Speed of service											
		Flexibility of service											
	Functional features	Reliability											
		Responsiveness											
		Assurance											
		Empathy											
		Tangibles											
	Price												

Figure B-1: The two dimensional relationship mapping matrix

APPENDIX C – RAW DATA

C 1.1 Sales Manager survey results

External Quality Dimension	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15	Average of each dimension	Standard Deviation	Total Avg
Technical Features of service																		
Accuracy of service	6	7	6	6	7	6	7	7	6	7	7	7	7	7	6	6.60	0.51	
Speed of service	7	7	6	6	7	7	7	6	7	7	7	6	7	7	7	6.67	0.49	
Flexibility of service	6	6	5	6	7	6	6	6	6	7	7	7	5	6	6	6.13	0.64	
Reliability																		6.02
R1.	6	5	6	6	7	5	6	6	6	7	7	6	4	7	7	6.07	0.88	
R2	6	5	5	5	7	5	7	6	6	7	7	6	5	6	7	6.00	0.85	
R3	6	5	6	5	7	6	6	6	6	7	6	6	4	7	7	6.00	0.85	
Responsiveness																		5.80
RS1	5	5	4	6	7	5	7	6	6	6	6	7	4	6	6	5.73	0.96	
RS2.	6	5	3	6	7	6	7	6	6	6	7	6	5	6	6	5.87	0.99	
RS3	6	5	3	6	7	5	7	6	6	6	7	6	5	6	6	5.80	1.01	

																Mean	SD	
Assurance																		5.87
A1.	7	5	3	6	7	5	6	6	6	6	7	6	6	6	6	5.87	0.99	
A2.	6	5	3	6	7	5	6	6	6	6	7	6	6	7	7	5.93	1.03	
A3	6	5	2	6	7	6	6	6	6	5	7	6	7	6	6	5.8		1.21
Empathy																		5.67
E1.	7	5	2	6	7	6	6	6	4	6	7	7	7	6	6	5.87	1.36	
E2	7	5	3	6	7	5	6	6	4	6	7	7	6	5	6	5.73	1.16	
E3	5	5	2	6	7	6	6	6	4	5	6	7	4	6	6	5.40	1.30	
Tangibles																		5.50
T1	6	5	2	6	7	6	7	6	6	6	7	6	7	4	5	5.73	1.33	
T2.	6	2	2	6	7	5	7	6	6	6	6	6	6	2	3	5.27	1.62	

C 1.2 Contact Employees survey results

External Quality Dimension	OP-1	OP-2	OP-3	OP-4	OP-5	OP-6	OP-7	OP-8	OP-9	OP-10	OP-11	OP-12	OP-13	OP-14	OP-15	Average of each dimension	Standard Deviation	Total Avg	Total STD
Technical Features of service																			
Accuracy of service	7	7	6	6	7	6	6	7	7	6	7	6	7	6	7	6.53	0.52		
Speed of service	6	7	6	6	7	7	6	7	7	6	7	6	7	6	7	6.53	0.52		
Flexibility of service	4	7	5	6	6	6	6	6	7	6	6	6	7	6	6	6	0.76	6.36	0.65
Reliability																			
R1.	2	7	5	6	5	6	5	5	7	7	7	6	7	7	6	5.87	1.36		
R2	2	7	5	6	6	6	6	6	7	7	6	6	6	7	6	5.93	1.22		
R3	4	7	5	6	6	6	6	6	7	7	6	6	6	7	6	6.07	0.80	5.96	1.13
Responsiveness																			
RS1	3	7	6	6	7	6	6	5	6	6	6	5	6	6	7	5.87	0.99		
RS2	6	7	6	6	5	4	6	6	6	6	5	5	6	5	5	5.60	0.74		
RS3	7	6	5	6	6	6	6	6	7	5	6	6	6	6	6	6.00	0.53	5.82	0.78
Assurance																			
A1	6	6	6	6	7	6	6	5	7	6	5	6	6	5	6	5.93	0.59		

																Mean	SD	Mean	SD
A2	6	7	4	6	6	6	6	5	7	6	5	6	6	5	6	5.80	0.77		
A3	6	6	5	6	5	5	5	6	5	5	5	6	6	5	6	5.47	0.52	5.73	0.65
Empathy																			
E1.	7	6	5	6	5	6	6	6	7	5	7	6	6	7	6	6.07	0.70		
E2	4	6	5	5	6	6	6	5	6	5	6	5	6	4	5	5.33	0.72		
E3	4	6	6	5	6	4	5	6	5	6	6	5	6	5	6	5.47	0.74	5.62	0.78
Tangibles																			
T1	2	7	6	5	6	4	6	6	5	4	4	5	5	3	4				
T2.	2	6	5	5	6	5	6	6	3	4	4	5	3	3	4	4.47	1.30	4.63	1.30

C 1.3 Customer survey results

Service Quality Dimensions	Check-In (10 informants)	Inflight Customer Support (10 informants)	Airport Experience (25 informants)	Customer Response Services (18 informants)	Total (63 informants)	Average of each dimension	Max	Min	Standard Deviation
Technical features									
Accuracy of service	5.60	6.70	6.16	6.17	6.16		7	3	0.99
Speed of service product	5.30	6.50	6.52	5.67	6.08		7	3	1.00
Flexibility of service product	5.00	6.00	6.24	5.56	5.79	6.01	7	3	1.05
Reliability									
R1	5.40	6.40	6.20	6.22	6.11		7	3	1.02
R2	4.40	6.10	6.00	5.44	5.60		7	3	1.20
R3	5.60	6.60	6.20	5.94	6.10		7	3	1.00
R4	5.60	6.20	6.48	5.89	6.13	5.98	7	3	0.94
Responsiveness									
RS1	5.30	6.60	6.76	6.06	6.30		7	4	0.93
RS2	5.40	6.00	6.60	5.78	6.08		7	3	0.97
RS3	4.90	6.60	6.72	5.83	6.16		7	4	0.92
RS4	5.10	6.10	6.56	5.83	6.05	6.15	7	3	0.97

Assurance

A1	5.50	6.50	6.56	6.50	6.37		7	4	0.75
A2	4.70	6.30	6.72	6.06	6.14		7	3	1.06
A3	5.30	6.60	6.84	5.72	6.24		7	3	0.89
A4	5.10	6.70	6.72	6.06	6.27	6.25	7	4	0.83

Empathy

E1	5.50	6.50	6.80	5.89	6.29		7	4	0.87
E2	5.60	6.40	6.80	6.00	6.32		7	5	0.80
E3	5.40	6.60	6.68	6.00	6.27		7	4	0.81
E4	5.10	6.70	6.84	5.83	6.25	6.28	7	3	0.88

Tangibles

T1	5.80	6.40	6.36	5.72	6.10		7	1	1.13
T2	5.40	6.10	6.48	6.00	6.11		7	4	0.84
T3	5.90	6.10	6.76	5.44	6.14		7	3	1.06
T4	4.50	6.70	6.60	5.67	6.02	6.09	7	1	1.26

Price of service

P1	4.90	6.10	6.08	5.78	5.81		7	3	1.16
P2	4.60	6.30	5.64	6.17	5.73	5.77	7	1	1.31

C 1.4 Lean assessment survey results

Statement No	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16	A-17	A-18	A-19	A-20	A-21	A-22	A-23	A-24	A-25	A-26	A-27	A-28
(1)	1	2	1	2	3	1	1	2	2	2	1	4	3	2	2	2	1	3	2	1	1	1	2	1	2	1	2	1
(2)	2	1	2	2	2	3	1	3	1	1	1	3	2	2	1	2	2	2	1	1	1	1	4	2	1	2	1	2
(3)	1	1	1	6	2	1	2	2	2	2	6	2	2	1	7	1	1	7	1	2	2	2	7	1	2	2	1	1
(4)	7	1	1	7	2	2	7	1	1	7	5	2	7	1	5	7	1	6	7	1	2	1	6	1	2	7	1	1
(5)	6	2	7	2	6	6	5	2	6	6	4	7	4	2	7	5	2	7	6	3	1	2	3	3	1	4	1	1
(6)	1	4	2	7	1	7	1	2	7	1	1	1	4	2	1	4	2	4	1	5	1	1	3	1	6	1	7	7
(7)	1	3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
(8)	5	7	1	4	1	7	4	1	7	5	1	1	5	7	1	5	1	1	5	1	1	1	1	1	1	5	1	1
(9)	5	1	5	2	1	5	1	5	5	2	5	1	5	2	5	1	5	1	5	5	1	5	5	3	2	3	1	5
(10)	1	5	1	2	1	5	2	1	2	5	2	1	3	3	1	4	5	1	2	2	5	1	2	4	5	4	5	1
(11)	7	1	7	1	7	4	1	7	1	1	4	7	2	7	7	1	7	7	1	7	1	7	3	1	7	3	7	7
(12)	6	7	7	6	7	7	6	7	6	7	7	6	7	7	7	7	7	7	6	7	7	6	7	3	3	7	7	3
(13)	1	1	1	2	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	3	1	3
(14)	2	1	1	1	5	1	2	2	2	2	2	2	5	2	2	2	1	5	2	5	2	2	5	5	2	5	2	5
(15)	1	2	1	2	1	1	1	1	2	2	1	1	2	1	1	2	1	1	2	1	2	1	2	2	1	1	1	1

Statements Ref	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13	B-14	B-15	B-16	B-17	B-18	B-19	B-20	B-21	B-22	B-23	B-24
(1)	1	4	1	2	1	1	4	1	2	2	1	1	6	2	1	1	2	1	2	1	2	1	1	1
(2)	2	4	2	1	2	2	3	2	2	1	2	2	4	2	2	1	3	2	1	1	3	2	2	2
(3)	1	7	7	2	1	1	6	1	7	2	2	7	2	7	2	1	2	2	2	2	1	7	1	2
(4)	1	7	6	1	7	1	7	2	7	2	2	7	2	6	1	1	6	7	1	7	1	6	1	1
(5)	2	6	7	2	6	3	4	3	6	4	3	7	4	7	3	2	6	7	3	7	3	7	6	3
(6)	1	1	5	1	5	1	1	6	1	4	1	5	1	5	1	1	4	1	4	4	1	2	1	1
(7)	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
(8)	7	5	4	7	4	1	4	7	5	1	7	5	1	4	7	7	4	6	1	4	1	4	1	1
(9)	5	7	1	5	5	7	5	3	5	5	7	5	7	1	5	1	5	3	2	7	3	2	7	2
(10)	1	5	4	1	3	5	1	3	1	4	5	2	2	4	1	5	1	2	2	2	5	1	1	2
(11)	7	1	7	7	1	7	7	1	7	1	7	7	7	1	7	1	7	7	7	1	1	7	7	7
(12)	7	2	7	3	7	3	2	7	2	7	7	7	7	2	7	7	7	7	7	2	7	2	7	7
(13)	1	1	2	1	2	1	1	1	1	1	2	1	2	1	2	1	2	1	2	1	1	1	1	2
(14)	2	5	2	1	5	2	1	1	5	1	2	1	2	5	2	2	1	1	1	1	5	1	5	1
(15)	1	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1

APPENDIX D – GUIDELINES AND VSM

D 1.1 Guidelines for the Lean appraisal tool

This section describes the guidelines for using the following Lean appraisal tool.

Dimension of Lean Outcome	Criteria	Weighted Scoring	Sub Criteria	Importance of Lean Project	Better Score is	Scoring		Percentage improvement of each	Percentage improvement of criteria
						Before	After		
Internal Quality	Operational Dimension	0.2	Processing Time	0.6	Low	5	3	40.00	
			Work in process	0.2	Low	500	400	20.00	
			No of Rework	0.1	Low	30	25	16.60	
			Non-value added/other wastes	0.1	Low	80	60	25.00	32.10
	Employee Dimension	0.2	Work Environment	0.25	High	5	7	40.00	
			Job Satisfaction	0.5	High	5	7	40.00	
			Leadership	0.25	High	4	6	40.00	
			Communication	0.25	High	6	7	40.00	
			Process Standardisation	0.25	High	3	4	50.00	
			Attitudes towards Lean development	0.6	Low	6	7	25.00	
			Productivity	0.25	High	4	6	50.00	
			Skills development	0.25	High	5	7	40.00	36.60
External Quality	Technical Features	0.1	Accuracy of service	0.5	High	4	6	50.00	
			Speed of service	0.5	High	4	6	50.00	
			Flexibility of service	0	Low	1	1	0.00	45.00
	Functional Features	0.2	Reliability	0.5	High	4	6	50.00	
			Responsiveness	0.3	Low	5	6	20.00	
			Assurance	0.2	Low	4	4.5	20.00	
			Empathy	0.5	High	5	7	40.00	
			Tangibles	0	Low	1	1	0.00	27.50
Price/Cost	Price /Cost	0.1	Cost reduction	0.8	High	80	60	25.00	
			Price of Service	0.2	Low	50	65	20.00	26.00
Customer Satisfaction	Cust-Satisfaction	0.2	Overall customer survey results	1	High	5.25	5.25	23.80	24.00
Employee Engagement	Emp-Satisfaction	0.3	Overall Employee survey results	1	High	5.25	5.25	23.60	23.00

Lean Appraisal Tool

Figure D-1: Lean appraisal tool

Four main steps were to follow for appraisal using the step-by-step guidelines: (1) *review and weight* the evaluation criteria, (2) *weight the* Lean project outcomes, (3) *score* the results, (4) *analyse* the results. The following section describes each step.

D 1.1.1 Review evaluation criteria

Evaluation criteria proposed in the Appraisal tool spread sheet but in this **step (1)** key stakeholder(s) should brainstorm to review, revise and justify criteria that are applicable to their Lean project (see figure D-2).

Once the criteria for a particular Lean project identified, the weighting score of each criterion depending on the characteristics and objectives of the specific project should be agreed.
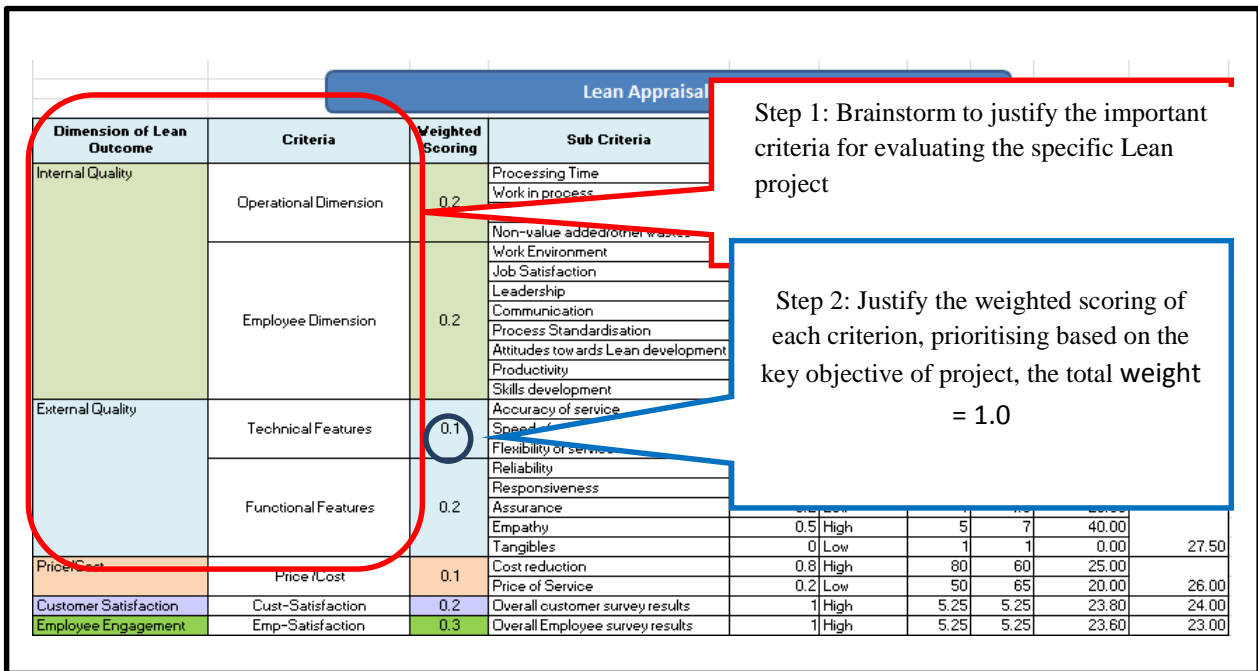
Figure D-2: Lean appraisal tool guideline (step 1-2)

The total weighted scoring is 1.00. This score reflects the importance of each criterion for the specific project. Each criterion can range from 0.00 to 1.00, the higher score representing the more important criteria. By assigning weighted scores the proposed Appraisal tool reduces the problems with the characteristics of different projects. For example, if a Lean project was to improve internal business activity, and therefore not connected with the external quality dimension, a score of 0.00 can be given.

According to Antony and Bhattacharyya (2010), it is important that performance measures should be rated and based on aggregations of multiple indicators in relation to the target, rather than based on only an absolute scale. Therefore, criteria should be divided into sub-criteria because it reduces evaluator bias. For this step, team consensus is necessary.

D 1.1.2 Weigh the Lean project results

After the previous activity as detailed above, identify sub-criteria. Some example sub-criteria are proposed in the tool as guidelines. Brainstorming technique can be used to define all sub-criteria. Once team agreement is reached, assign the *degree*

of importance of each sub-criterion. Then allocate the total score to each sub-criterion under the same criterion is 1.00. Users can also give a score of 0.00 to represent irrelevant criterion to the particular project (see figure D-3).
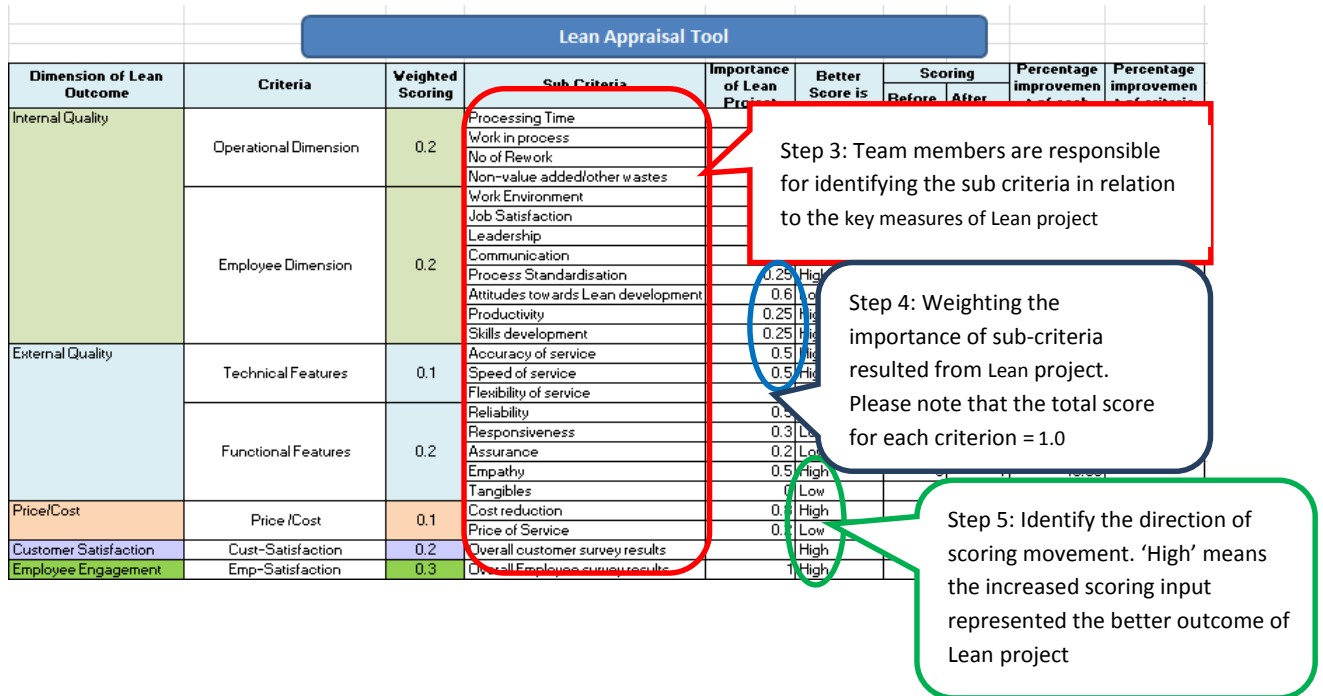

Figure D-3: Lean appraisal tool Guideline (step 3-4-5)

Since a more desirable outcome of a project might result from either higher or lower scoring of each sub-criterion, it is important to justify the direction of the scoring movement. Thus, identify the desired direction of the scoring movement of each sub-criterion, by choosing 'High' or 'Low' from the drop-down list. For instance, in the case where increased scoring means the better results from the project, users have to select 'High' for calculation purposes in the next step.

D 1.1.3 Score the Lean project results

In order to evaluate outcomes against the criteria, it is recommended to use the 'percentage of improvement', rather than separate measures. This eliminates the problems caused by different measures and scoring systems of each sub-criterion. For example, if a project reduces processing time from six to four days. It means that the processing time can be improved by 40% resulting from the project.

The reason for this scoring is to investigate the improvement results by comparing 'before' and 'after' the improvement. Since the criteria for each group may be different various approaches can be employed to score, as summarised in Table D-1.

Table D-1: Summary of approaches & criterion

Key Measures	Assessment approach
Operations Process	Direct measurement
Operations employee	self-assessment using seven point Likert scale
Technical features	Contact-employee assessment (seven-point Likert scales)
Functional features	
Price	Direct measurement
Cost reduction	
Customer, Employee Satisfaction	Customer/Emp survey (seven-point Likert scales)

Based on the research findings, the outcomes related to operations process and cost reduction can be measured directly. The project team members can score these criteria, by assessing each criterion before and after implementation of the Lean project. For the operations employees, *self-assessment* was considered appropriate for assessing these outcomes from their perspectives (questionnaire stored in Appendix B and raw data in Appendix C).

As stated in the literature customers cannot directly perceive that a better service quality, related to technical and functional features, is a result of the Lean project. Therefore, customer-contact employees were contacted to score before and after project implementation. This is in line with the literature that pin points that employee can effectively judge the service quality delivered to customers (Sergeant and Frenkel, 2000). The Lean appraisal tool also considered the importance of understanding the outcomes of Lean project from customers and employees perspectives. The *customer and employee survey* is then used as the main approach for assessing their satisfaction levels. At this point, self-assessment, contact-employees assessment and customer survey were circulated to record data on seven-point Likert scales (see figure D-4).

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> Step 6: Scoring the results of each key criterion using various approaches for assessing different criteria

Dimension of Lean Outcome	Criteria	Weighted Score	Sub Criteria	Importance of Lean Project	Better Score is	Before	After	Percentage improvement of each	
Internal Quality			Time	0.6	Low	5	3	40.00	
				0.2	Low	500	400	20.00	
				0.1	Low	30	25	16.60	
			added/other wastes	0.1	Low	20	10	25.0	
			hment	0.25	High	5	7	40.0	
			tion	0.5	High	5	7	40.00	
				0.25	High	4	6	40.00	
			tion	0.25	High	6	7	40.00	
			Process Standardisation	0.25	High	3	4	50.00	
			Attitudes towards Lean development	0.6	Low	6	7	25.00	
			Productivity	0.25	High	4	6	50.00	
			Skills development	0.25	High	5	7	40.00	36.60
External Quality	Technical Features	0.1	Accuracy of service	0.5	High	4	6	50.00	
			Speed of service	0.5	High	4	6	50.00	
			Flexibility of service	0	Low	1	1	0.00	
	Functional Features	0.2	Reliability	0.5	High	4	6	50.00	
			Responsiveness	0.3	Low	5	6	20.00	
			Assurance	0.2	Low	4	5	20.00	
			Empathy	0.5	High	5	7	40.00	
			Tangibles	0	Low	1	1	0.00	
Price/Cost	Price/Cost	0.1	Cost reduction	0.8	High	80	60	25.00	
			Price of Service	0.2	Low	50	65	20.00	
Customer Satisfaction	Cust-Satisfaction	0.2	Overall customer survey results	1	High	5.25	5.25	23.80	24.00
Employee Engagement	Emp-Satisfaction	0.3	Overall Employee survey results	1	High	5.25	5.25	23.60	23.00

Direct measurement
Self-assessment
Contact employee assessment
Direct measurement
Customer / employee survey

Figure D-4: Lean appraisal tool guideline (step 6-7)

Once the scores recorded for all criteria, the percentage improvement of each sub-criterion can be calculated and displayed utilising the pre-designed formulas (step 7). Summary of percentage of improvement by criteria can also be calculated based on weighted-average method. This represents the average improvement percentage relating to each criterion defined in the first step.

D 1.1.4 Analyse the results

The final step focuses on analysing the results from the Lean appraisal tool. The percentage of improvement related to the sub-criteria can be summarised and tabulated, for easy-to-understand format (*step 8*). Additionally, the relative percentage of the total improvement of each dimension can also be calculated to show the contribution to the overall percentage of improvement resulting from the Lean initiative (***steps 9 & 10***). These results should help practitioners to understand to which criterion they should focus to make improvement as the final step (see figure D-5).

Lean Aprriasal Analysis			
Dimension of Lean Outcome	**Criteria**	**Percentage improvement of criteria**	**Relative Percentage of total**
Internal Quality improvement			13.77
	Operational Dimension		
		32.17	
	Employee Dimension		
		36.67	
External Qualit	l Features		7.25
		45.00	
	Functional Features		
		27.50	
Price/Cost i	st reduction	20.00	2.60
	te of service	6.00	
Customer S	atisfaction	23.81	7.14
Employee E	Satisfaction	23.00	6.00
Total percentage of improvement			36.76

Step 8: Analyse the percentage of improvement for each sub-criterion

Step 9: Analyse the relative percentage of improvement for each criterion

Step 10: Analyse the total percentage of improvement of Lean project

Figure D-5: Lean appraisal tool guideline (step 8-9-10)

The outcomes of the project can be presented in a graphical format, using the radar plot chart which will provide visual comparison with other Lean projects (Figure D-6). The analysis results should provide practitioners an understanding of the outcomes of the improvement project focused on some key dimension, as well as the total percentage of improvements resulted from the Lean project.
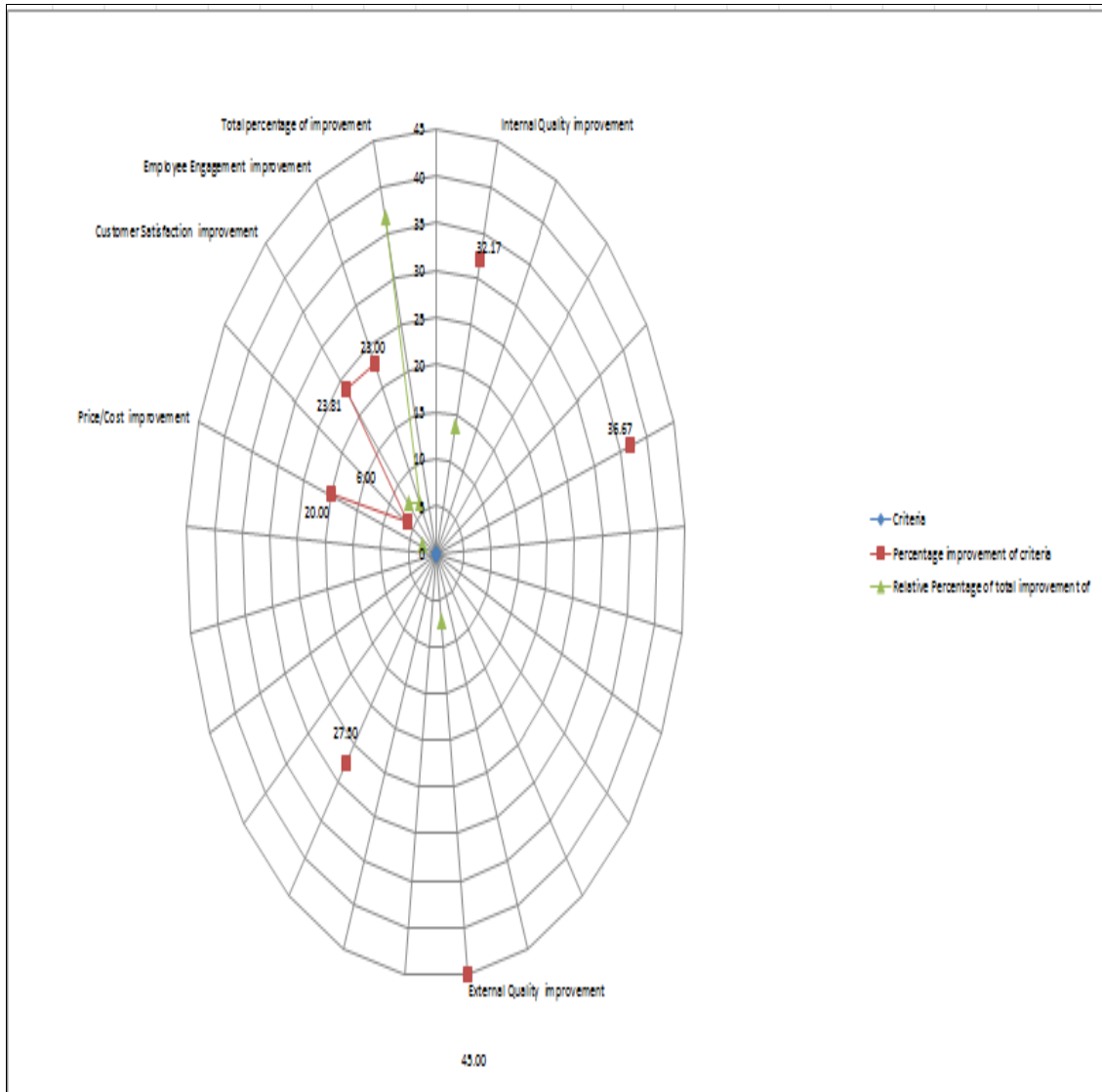
Figure D-6: Summary of Lean project outcomes

D 1.2 Value creation map of the case study company

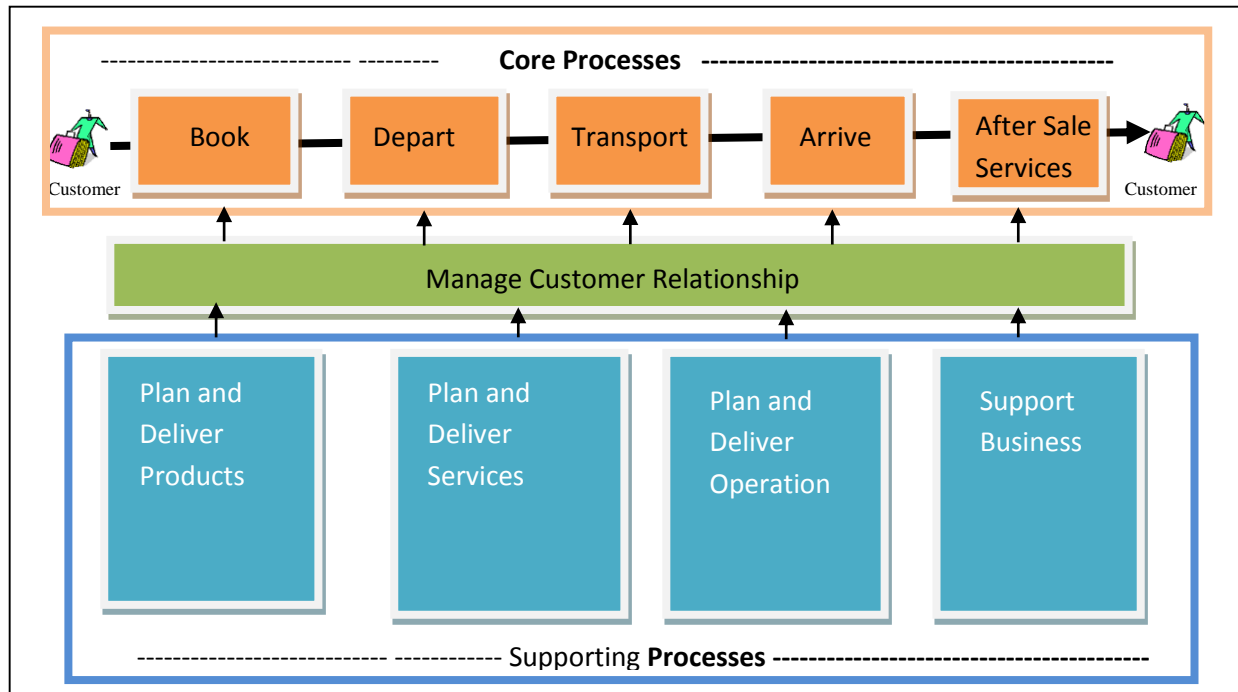The following diagram depicts the end to end value creation for the case study company.

Figure D-7 End to end view of the airline company processes

The following paragraphs describes the case study company's department's activities briefly;

Plan and Deliver Products is responsible for all major purchases for the organisation such as new aircraft, fuel and property. A plane can incur costs on a daily basis and generate revenue when it is off ground through carrying freight and/or passengers. Finance department handle company finances (profit and lost accounts, expenditures and assets). They oversee internal and external costs to run an airline.

Plan and Deliver Services include sales and marketing, reservations and ticketing management and administrative staff departments. Airline prices change frequently to meet with supply and demand and to reflect changes in comparisons to the prices of competitors' fares. Travel agents sell some % of their tickets *Reservations and*

Ticketing division have adapted the most technological changes in recent years. Major changes in air transportation have simplified the process for airline passengers to make a reservation and to purchase a ticket using an eCommerce platform. Electronic self-service check-in kiosks are now seen at all major airports as well as Internet check-in functionality is now available on many carriers' own websites.

Plan and Deliver Operations include flight, ramp, customer service and technical operators. Operations personnel are responsible for operating an airline's fleet of aircraft safely and efficiently. This department is also responsible for training to all flight-crew and safety procedures training and refresher training after every few months.

Support Business includes a number of departments including Engineering, IT, Human Resource Management and Management and Administrative teams.

According to Weatherford and Bodily (1992), the objective of airline management is maximising revenues without sacrificing customer satisfaction. There are operational, marketing and strategic constraints in airline Operations. As operational constraint, there is a fixed capacity of seats to offer. Aircraft with different cabin capacities could be used for a given flight. Scheduled routes, the number of aircraft and the frequency of flights are other operational constraints. As marketing constraints, there are minimum tolerable customer service levels such as number of denied customers or number of customer complaints. Strategic constraints are determined by the long term vision of the top management which could be affected by the competitors' actions, their prices, routes, and flight schedules. The costs relevant to revenue management studies are variable costs for the seat and the cost associated with the denied boarding event. Denied boarding cost is hard to measure as it includes loss of customer goodwill besides denied boarding compensation, possible overnight hotel stay or complimentary things.