# An Evaluation of the Transferability of Manufacturing-Derived Lean Improvement Tools and Techniques to the Local Government Sector

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## Abstract

The unsustainable increases in public spending have resulted in extreme pressure from the UK Government in the Local Government (LG) sector to improve performance, service and efficiency. The Lean philosophy, which is an approach to reduce waste, was developed within the Manufacturing sector and has been used in manufacturing organisations to improve operational performance for over 30 years.

This research investigated the transferability of the Lean philosophy from the Manufacturing sector to LG. The research was conducted in conjunction with North East Consultants (NEC) whose manufacturing derived lean model has been the vehicle for evaluating the issue of transferability to the LG sector.

Case study research was undertaken within three local authorities and nine detailed case studies have been completed, each covering a lean intervention within a different area of business within LG. Data collection for each case study involved extensive semi-structured interviews to collect rich qualitative data from (i) lean consultants, (ii) LG senior management and (iii) LG lean team members, in addition to quantitative data on intervention performance. Individual and cross case analysis has identified that the Lean philosophy is transferable into this particular setting and can deliver improvements of the range expected, but that the LG setting is very different from the Manufacturing sector in terms of the variation, nature and outputs of the processes contained within it. In addition, a number of significant model deficiencies have been identified. These deficiencies which can be considered to impede the success, adoption and sustainability of the Lean philosophy within LG cover both model content and delivery and can broadly be categorised as: (i) the inappropriate selection of tools and techniques, (ii) a diagnostic tool not sufficiently adapted for use in the LG sector, (iii) a training and delivery model whose timescales and content do not aid participant learning and buy-in, (iv) a lack of consideration regarding the sustainability of the lean approach post-consultation, relating to (a) the development of internal lean leaders and (b) how the Lean philosophy can be embedded as an ongoing element in helping to deliver department objectives.

To aid the success and sustainability of the lean approach to waste reduction in the LG sector a new framework has been suggested which will recognise the differences between the Manufacturing sector and LG and seek to overcome the deployment and sustainability deficiencies highlighted in the research.

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## TABLE OF CONTENTS


**Chapter One Introduction**

1.1 Introduction 10
1.2 Focus and Aims 11
1.3 Key Research Questions 12
1.4 Approach 13
1.5 Thesis Structure 14

**Chapter Two Literature Review**

2.1 Introduction 16
2.2 Lean - Towards an Understanding 17
2.2.1 Lean Definition 17
2.2.2 Lean Origins 19
2.2.3 Just-in-Time 23
2.2.4 Lean Philosophy 28
2.2.5 Lean Aims 29
2.2.6 Lean Tools and Techniques 31
2.2.7 Benefits of using Lean within Manufacturing Organisations 36
2.2.8 Barriers to Lean Implementation 38
2.2.9 Caveats or Perceived Limitations 40
2.2.10 Summary 41
2.3 Public Sector 43
2.3.1 Drivers for Productivity Change within the PS 44
2.3.2 Productivity within the PS 47
2.3.3 Exisiting Lean-based Models 51
2.3.4 Lean Tools and Techniques within the PS 68
2.3.5 Effects of Lean in the PS 74
2.4 Critical Analysis 89
2.4.1 Lean issues from Manufacturing 89
2.4.2 Lean issues from the PS 90
2.4.3 PS Analysis 91
2.4.4 Areas to be considered in the Research 93

**Chapter Three Research Methodology**

3.1 Introduction 94
3.2 Aim of the Research 94
3.3 NEC Model 95
3.4 Research Paradigm 98
3.5 Approach 99
3.6 Data Collection 104
3.7 Data Analysis 106
3.8 Recommendation of a new Framework 107
3.9 Research Validity 107
3.10 Ethical Issues 108

3.11 Summary _____ 108

**Chapter Four Case Study Analysis**

4.1 Introduction _____ 110
4.2 Case Study Overview _____ 111
4.3 Cross Case Analysis _____ 124
4.3.1 Lean Consultants _____ 126
4.3.2 Senior Managers _____ 135
4.3.3 Departmental Staff _____ 145
4.4 Evaluation _____ 153
4.4.1 Answering the Research Question _____ 159
4.4.2 Evaluation of the Model _____ 161
4.5 Summary _____ 165

**Chapter Five Critical Analysis**

5.1 Introduction _____ 168
5.2 Methodology _____ 168
5.3 Lean Model _____ 171
5.4 Diagnostic Tool _____ 172
5.5 Summary _____ 173

**Chapter Six Towards a New Framework**

6.1 Introduction _____ 174
6.2 Justification for a new Framework _____ 174
6.2.1 Diagnostic Tool _____ 174
6.2.1.1 What are the deficiencies? _____ 174
6.2.1.2 How the deficiencies should be addressed _____ 176
6.2.2 Tools and Techniques _____ 178
6.2.2.1 What are the deficiencies? _____ 178
6.2.2.2 How the deficiencies should be addressed _____ 179
6.2.3 Leadership _____ 180
6.2.3.1 What are the deficiencies? _____ 180
6.2.3.2 How the deficiencies should be addressed _____ 181
6.2.4 Training _____ 182
6.2.4.1 What are the deficiencies? _____ 182
6.2.4.2 How the deficiencies should be addressed _____ 184
6.2.5 Sustainability _____ 185
6.2.5.1 What are the deficiencies? _____ 185
6.2.5.2 How the deficiencies should be addressed _____ 186
6.2.6 Summary _____ 186
6.2.6.1 Deficiencies of the model _____ 187
6.2.6.2 What the new framework should include _____ 187
6.3 Towards a new Lean Framework for LG _____ 188

6.3.1 Content / Approach _____189
6.3.2 Stages of the SIT Framework _____193
6.4 Summary _____206

**Chapter Seven Conclusion and Further Research**
7.1 Introduction_____207
7.2 Research Focus _____207
7.3 Achievement of the Research _____208
7.4 Were the Research Objectives met? _____214
7.5 Recommendations for further Research_____215

**References**

**Apendices:**

**Appendix (1):**

**Table of Case Study Questions and Coding System**

**Appendix (2):**

**Schedule of Questions**

**(a) Lean Consultants**

**(b) Senior Managers**

**(c) Departmental Staff**

**Appendix (3):**

**Case Study Individual Analysis**

## LIST OF FIGURES AND TABLES

### Figures

Figure 2.1 The Lean Philosophy of Operations _____19
Figure 3.1 NEC Model _____97
Figure 3.2 Case Study Method adapted from Yin (1994)_____102
Figure 4.1 Structure of Case Study Analysis Chapter _____111
Figure 4.2 Structure of Case Study and Cross Case Analysis_____116
Figure 6.1 Stages of the new Lean Framework _____189

### Tables

Table 2.1 Lean Tools and Techniques used in Manufacturing and Automotive Industries _____34
Table 2.2 Existing Lean-based Models _____66
Table 2.3 Lean Tools and Techniques used in the PS (Health care) _____72
Table 2.4 Lean Tools and Techniques used in the PS (LG) _____73
Table 2.5 PS Case Study Analyses _____88
Table 3.1 Approach to Methodology _____100
Table 3.2 Data Collection Approach _____105
Table 4.1 Overview of the Nine Case Studies _____115
Table 4.2 Table of Case Study Questions _____125
Table 4.3 Lean Tools and Techniques delivered by NEC _____130
Table 4.4 Cross Case Analysis Evaluation _____158
Table 6.1 Comparision of Aspects of the Proposed New Framework (SIT) with other Lean Models _____190
Table 6.2 Stage 1: Senior Management and Lean Leader Awareness ___193
Table 6.3 Stage 2: Assessment _____194
Table 6.4 Example of how a Diagnostic Template could be designed for use in LG _____197
Table 6.5 Stage 3: Intervention Identification_____199
Table 6.6 Stage 4: Training _____200
Table 6.7 Stage 5: Lean Interventions _____203

Table 6.8 Stage 6: Evaluation _____205

# Chapter One
# Introduction

## 1.1 Introduction

Increases in public spending across the UK and subsequent adverse effects from the global economic recession have given the UK Government cause to pressurise Local Government (LG) into re-evaluating how productivity improvements and value for money can be better achieved. This research will focus on the transferability of lean into LG which is a key part of the Public Sector (PS). At the commencement of the research project it was the Gershon Report (2004) which was the main policy driver for change within the UK's PS. It focused attention on productivity improvements and set out new requirements for efficiency and customer focus across the PS. The report was to feed into the 2004 Spending Review and make recommendations for Ministers in an attempt to make realistic departmental efficiency targets up until 2008. This has now followed on to be included in the subsequent Comprehensive Spending Review (2007) which focuses on achieving financial savings in excess of £30 billion within the PS up until 2011. These targets have been widely and publicly discussed in events leading up to the 2010 general election and remain one of the main policies under scrutiny. This strategy is now continuing in response to the global economic recession through the Treasury's Operational Efficiency Programme (2008) and is monitored by the Audit Commission. The consequence of the report for LG departments means they must respond by delivering high quality services, provide value for money and raise standards of performance. The Lean philosophy and its associated techniques is one approach that can help LG achieve their efficiency targets. This can be achieved through reducing waste by eliminating non-value added activities from processes which ultimately meets customer expectations, reduces costs and improves productivity.

Although the Lean philosophy is one way of addressing this issue the academic literature reports most PS improvements, to-date, has been made within the National Health Service (NHS) compared to LG (Radnor et al, 2006 and Loader, 2009). Limited findings within academic literature also reveal the trend for lean implementation in LG has been through the use of business consultancies whose

backgrounds derive from manufacturing and possess limited knowledge of how LG operates (Suarrez-Barraza et al, 2009). Lean implementation within LG creates a research challenge because there are significant differences in the way it operates compared to health care despite both organisations being part of the PS. These differences will be investigated later in the research although the potential challenges for lean being implemented in LG include the sector being described as multi-focused, they offer tangible and non-tangible services and the customer is not always present in the delivery process. Lean was originally developed for use in manufacturing organisations who produce tangible goods for the end customer who are never present during the delivery process.

Gaps exist within the academic literature where specific research into the transferability and transformation of the Lean philosophy and its associated techniques into LG is required. There is also no formal model to bring about lean's widespread use within LG other than those used by business consultants. This research bridges the gap in the limited information already known about lean deployment in LG by investigating the Lean philosophy, which models and lean tools and techniques are effectively used and what support is needed for lean's long-term success in LG. A methodology was formulated to assess the impact of contextual factors on lean's implementation success in areas such as sustainability, institutional culture and management and the relevance of specified outcomes as measures of productivity. A framework was developed to aid the success and operational performance of lean within LG.

### 1.2 Focus and Aims

The focus at the beginning of the study was in the Health sector and LG although a change of circumstance with the project sponsor required this to change. The research focus was amended to evaluate the transferability of lean manufacturing improvement tools and techniques to LG. Therefore, the research has two aims:

1. To assess the transferability of the Lean philosophy and its associated elements from the Manufacturing sector to LG.

2. To recommend a framework to aid the success and operational performance of lean tools and techniques within LG.

The principal aim of the research was achieved through critical analysis of academic literature and case study research. The focus of most academic work has been in health care although there is relevance to LG as both organisations are part of the PS. This data was analysed and used together with answers to the key research questions to recommend a framework to aid the success and operational performance of lean tools and techniques within LG. At present it is not possible to test a new lean framework due to changes in NEC's business environment.

### 1.3 Key Research Questions

In order to address the focus and aims of the research it was important to gain a detailed understanding of lean implementation and contextualised issues relating to LG. These were examined within both the literature review and case study analysis as formulated within the methodology. Related literature themes were used as sub-categories within each of the four key questions to generate further enquiry and gain a more in-depth understanding of key lean issues. Key questions and examples of issues within their sub-categories include:

1. What are the policy drivers and expectations from using lean?
    - Identify which policy drivers and reasons for change were provided by LG departments in their attempt to adopt lean.

2. How appropriate is the lean model, including its tools, techniques and process?
    - Model - was the lean model and diagnostic tool easy to understand and use? Was the model relevant for the organisation and how effective was the external change-agent?
    - Lean Tools and Techniques - how useful were the lean tools and techniques and were they easy to understand?

- Appropriateness - how did lean compare to other productivity models used before the intervention?

3. What are the factors that may influence lean implementation success?
    - Process - what were the effects of the lean intervention upon time, resources and productivity for LG?
    - Organisational Culture - what effects did organisational culture have upon the lean intervention?
    - Sustainability - what were the issues and how did they affect the possible future use of lean within the organisation?
    - Barriers - what other problems were encountered that could affect lean's implementation success?

4. Have the intended outcomes been achieved?
    - What benefits were gained from the lean intervention?

### 1.4 Approach

The focus of the research was conducted across three LG organisations using data from nine departmental case studies. The vehicle to assess the transferability of lean was the lean model used by NEC. NEC is a North East Business Consultancy providing advice and support for various sectors including LG, NHS and manufacturing industries who are seeking to adopt lean productivity techniques. They have a basic lean model that is derived from manufacturing which is based on the Toyota Production System (TPS). A case study approach was used based upon multiple sources of evidence combining qualitative and quantitative data. The approach began with obtaining data from personnel used through semi-structured interviews and documentation involved in each lean intervention. The information was then analysed in order to help develop and recommend a new framework to aid lean implementation within LG.

## 1.5 Thesis Structure

The layout of the thesis is presented as:

Chapter 2 - Literature Review

The chapter provides a review and critical analysis of academic literature regarding lean and its development to-date within the PS. It begins with the origins of lean and goes onto discuss the philosophy and its aims and associated tools and techniques within the manufacturing industry, especially Toyota where the model is thought to have derived. Successful implementation of lean together with factors such as benefits, barriers and criticisms are identified using academic case studies found within various manufacturing industries.

The chapter progresses onto the PS where a comparison of how manufacturing and PS organisations function is made in terms of productivity. It investigates how productivity differs between PS departments and organisations and discovers how productivity can be measured in this context. Drivers for productivity improvement within the PS are discussed and in particular the chapter identifies which policy documents are influencing change. Effects of lean within the PS are examined through academic case study scenarios found within health and LG organisations. These investigate how various PS organisations have adopted lean including their success factors, benefits and barriers. Identification of lean tools and techniques used across the Health sector and LG departments is made in comparison with the manufacturing industry.

Chapter 3 - Research Methodology

This chapter describes the development of the research design used throughout the thesis and discusses the rationale behind the approach.

Chapter 4 - Case Study Analysis

The chapter contains analysis and findings from nine case studies across three LG organisations having used the same lean model introduced by a North-East Business Consultancy, NEC. The model and tools and techniques used in this approach will contribute towards answering the research aim of assessing the transferability of the lean framework into LG.

Chapter 5 - Critical Analysis

The chapter critiques how various stages of the methodology has impacted the research findings.

Chapter 6 - Towards a New Framework

Recommendations for change and development to existing approaches, processes, and techniques are discussed using information obtained from the case study analysis.

Chapter 7 - Discussion and Conclusion

The findings of the research are presented within this chapter. Recommendations for further study are suggested.

# Chapter Two
# Literature Review

## 2.1 Introduction

The purpose of this chapter is to examine the concept behind lean and discover how it has so far been applied in the Public Sector (PS) and particularly in Local Government (LG). Information obtained from the chapter will go towards formulating an understanding of any issues that need to be considered for the methodology chapter with regards to the relevance and transferability of lean into LG. The knowledge will then be used together with findings from the case study analysis chapter to help recommend a framework for lean's implementation success within LG.

Although this research focuses on lean implementation within LG there is a limited amount of academic literature to review these findings. This chapter therefore focuses on academic literature covering health care as this is where most lean deployment has taken place and is therefore deemed useful as a basis for this research.

The chapter begins by gaining an understanding of the origins and philosophy of lean within the manufacturing industry together with its associated tools and techniques. Case study examples will be used from the academic literature to explore how the benefits and barriers to lean implementation have affected the manufacturing industry. Caveats to its use will be discussed before moving onto the second part of the chapter which will discuss how lean implementation has so far been introduced within the PS. This section of the chapter will begin by examining drivers for change and what constitutes productivity within the PS. Existing lean-based models will discuss how they have been applied across four different PS organisations in comparison to manufacturing which is represented by Toyota. This is followed by an investigation into how lean tools and techniques have been applied across the health care and LG sectors and then explores the effects of lean in the PS using case study scenarios. The chapter concludes with a summary of the salient issues obtained from academic literature that will be

used towards formulating questions for the research investigation and to recommend a framework for lean's implementation success within LG.

## 2.2 Lean - Towards an Understanding

The intention of this section is to introduce the Lean philosophy and make its association with the Toyota Production System (TPS) and Just-in-Time (JIT) evident by providing a definition of its purpose, origins and examination of the philosophy and aims. It will then go on to explore the tools and techniques used within its framework and benefits that can be obtained before ending with its barriers to implementation and a description of its criticisms found in the academic literature.

### 2.2.1 Lean Definition

It is from the book 'The Machine that Changed the World' (Womack et al, 1990) that the phrase 'Lean Production' was introduced and popularised by bringing it to the attention of the Western world. The primary aim of the book was to report the findings obtained from the Institute of Motor Vehicle Programme's study in 1986 of lean production versus mass production within the automotive industry.

Before providing a definition of Lean, it is necessary to point out its alternative names used in the academic literature. Lean has been referred to the Toyota Production System (Ohno, 1988), Toyota Management System (Monden, 1993), Just-in-Time (Voss, 1986 and Harrison, 1992), Stockless Production (Hall, 1982), Lean Production (Womack et al, 1990, and Liker (2004), Lean Management (Emiliani et al, 2003) and Lean Manufacturing (Shingo, 1981). A study examining the definition and measures of lean production by Shah et al (2007) and supported by Emiliani (2006) suggests the ambiguity of the terminology exists because lean has evolved over a long period of time and its equivalent related approaches has created confusion to its purpose. In order to prevent more confusion and as alternative names have already been mentioned, this study will now address the concept simply as 'lean.'

Lean can be defined as:

*"…compared to mass production it uses less of everything - half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Also it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of products."* Krafcik (1988).

*"Lean Production is a philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities in the enterprise. It involves identifying and eliminating non-value adding activities in design, production supply-chain management, and dealing with the customers. Lean producers employ teams of multi-skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety."* American Production and Inventory Control Society Dictionary, Cox and Blackstone (1998).

*"It is reducing time from customer order to manufacturing and delivering products by eliminating non-value-added waste. The ideal of a lean system is a one-piece flow. A lean manufacturer is continuously improving towards that ideal."* Liker (1997).

*"Lean production is an integrated system that accomplishes production of goods/services with minimal buffering costs."* Hopp and Spearman (2004).

*"…is aimed at the elimination of waste in every area of production including customers' relations, product design, suppliers' networks and factory management. Its goal is to incorporate less human effort, less inventory, less time to develop products, and less space to become highly responsive to customer demand while producing top quality products in the most efficient and economic manner possible."* Massachusetts Institute of Technology (2000).

*"Lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability."* Shah and Ward (2007).

On analysing the definitions one may conclude that lean is associated with improving productivity in manufacturing with the exception of Hopp and Spearman (2004) who include services in their description. The reason for this analogy is that lean originated in a manufacturing environment to help deal with improving productivity targets and compete within the global market. The main similarities between all of the definitions are that lean deals with the elimination of waste, it involves all areas of production and aims towards meeting customer demand. Figure 2.1 is used to display and summarise the aspects of lean (Slack et al, 2004). It shows how lean is a philosophy of operations that eliminates waste, involves everyone and continues to improve. Lean also uses a method of

planning and control and seeks to achieve the aims of its philosophy by adopting a system of tools and techniques.

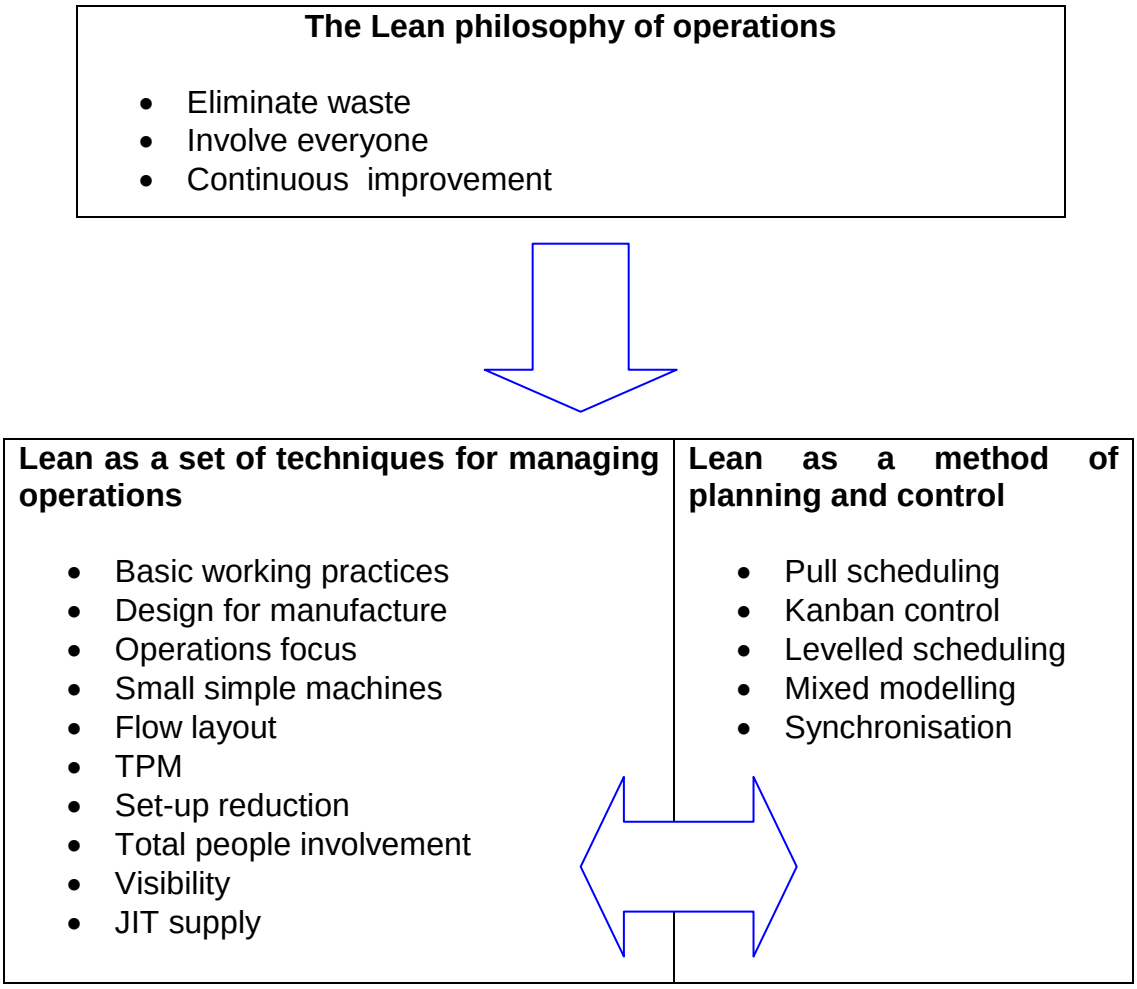


**Figure 2.1 The Lean Philosophy of Operations**
*Source: Slack et al (2004)*

2.2.2 Lean Origins

The foundations of lean lie in TPS stated by Shingo (1981), Monden (1983), Ohno (1988) and Emiliani (2006). Holweg (2007) and Liker (2004) explain the lean origins date back to the late 19th Century with Sakichi Toyoda who established a spinning and weaving business based on his automatic loom. After he sold the patents in 1929, the funds were transferred for his son Kiichiro to realise his ambition of manufacturing automobiles. The Japanese market was already dominated by local subsidiaries of Ford and General Motors (GM) that had been established in the 1920's and as a consequence starting up Toyoda's automotive business was met with financial difficulties. Despite this problem Kiichiro managed

to design his Model AA by making a large use of Ford and GM components (Cusumano, 1985). Following this success the Company was renamed 'Toyota' to simplify the pronunciation and create no meaning of the word in Japanese.

At the end of 1949 there was a collapse in sales that resulted in Toyota having to lay off a large part of their workforce which resulted in strikes that forced Kiichiro's resignation. In thirteen years since they began production Toyota had only produced 2,685 automobiles compared to 7,000 that Ford could produce by one of its plants in one day (Womack et al, 1990). Eiji Toyoda, who succeeded Kiichiro and became managing director realised that improvements had to be made if Toyota was to succeed and therefore made a visit to Ford's Rouge automotive plant to study their mass production system. Copying mass production techniques was to prove difficult mainly due to the financial constraints forced upon the Japanese economy due to the after-math of the Second World War (Liker, 2004 and Vonderembse et al, 2004). Papadopoulou (2005) explains that the success of Toyota evolved following this study and led to a complete reconstruction of the Company which saw the introduction of TPS. This system introduced by Taiichi Ohno was aimed at directly attacking any form of waste in the production process (Papadopoulou, 2005; Liker, 2004 and Womack et al, 1990). Ohno (1988) characterised the key objectives of Toyota's management practice as:

*"Production efficiency by consistently and thoroughly eliminating waste"* and *"the equally important respect for humanity."*

Emiliani (2006) states the focus of early writings describing TPS such as Monden (1983) and Womack et al (1990) for example, were mainly descriptions of operational aspects of the Company designed to improve production efficiency rather than giving any mention of the human resource aspect of the process. He adds that general descriptions of post World War II Japanese management systems were either operations management or human resource management but no integration of both.

The American productivity consultant W.E Deming who gave seminars on quality and productivity to Japanese manufacturers in the 1950's and 1960's was

influential to Toyota (Waller, 1999). He taught that in a business system, meeting and exceeding customers' requirements is essential for everyone in the organisation to strive towards. The use of the term 'customer' included those outside the organisation and those within it, therefore everyone in the production line or business process was to be thought of as a 'customer' and to be supplied with what was needed, at the exact time needed (Liker, 2004). Liker (2004) goes onto explain that this principle was to become a crucial part of JIT and the pull system within it.

Another key individual who is jointly credited with Taiichi Ohno for the success of TPS is Shigeo Shingo who is famous for his work on single-minute exchange of dies (SMED) (Emiliani, 2006). This process contributed to the TPS philosophy by changing over production equipment in as little time as possible, therefore contributing to the elimination of wasteful activities.

Ohno (1988) introduced two concepts that formed the basis of TPS which were Jidoka or 'autonomous machine' and JIT. Holweg (2007) explains that Jidoka as he translates as 'built-in quality' was inspired from Ohno's previous experience of working with the automatic loom that stopped once the thread broke, in order not to waste any material or machine time; whilst JIT came about through observing Kachiiro who had all the parts for assembly at the side of the production line just in time for the user. Ohno visited U.S automotive factories in 1956 and incorporated ideas he developed from these visits, where the most notable one was 'kanban' meaning 'signal' that was to become part of Toyota's 'pull system.' This new system adopted by Toyota was inspired through observing American supermarkets where individual items are re-stocked as each item begins to run low on the shelf. Liker (2004) explains that this 'pull' system continues to cascade backwards to the beginning of the manufacturing cycle and prevents overproduction of excess inventory which is a form of waste. Without this pull system JIT would never have evolved as it delivers the right items at the right time in the right amounts (Liker, 2004). The terms Jidoka, SMED, JIT and Pull are significant because they were the first lean technical techniques to form the basis of TPS.

Supplier manuals were produced under the direction of Taiichi Ohno in the 1950's, which shared the secrets of Toyota's success in using their techniques (Hines et al, 2004). These manuals however were produced in Japanese and it took another decade before the first English literature became available. Despite this knowledge being made available to fellow manufacturers the literature was difficult to understand and even the Toyota employees found difficulty in explaining their own systems (Holweg, 2007). It wasn't until the oil crisis of 1973 that a renewed interest was made into the research of these techniques and the starting point of the International Motor Vehicle Programme was begun which subsequently saw the publication of their study being made public into the benefits of TPS.

Fujimoto's (1999) account of the origins and development of TPS states that Toyota selectively adopted various elements of the Ford system and combined them with their own system together with ideas taken from other industries such as textiles. He adds it is therefore a myth that TPS was a pure invention but appreciates the production managers such as Kiichiro Toyoda, Taiichi Ohno and Eiji Toyoda were fundamental in integrating elements of the Ford production system and transferring them into a domestic environment different to the United States.

By reviewing the historical account of the origins and evolution of lean in TPS some conclusions can be drawn from these findings. TPS originated out of a need to emerge from a crisis and to both survive and succeed within global manufacturing competition. The system was restricted to manufacturing industries as it was in this environment where it was developed. It concentrated on operational management because the techniques focused on processes to remove wasteful activities within the production cycle. TPS was not a new invention but took time to develop and the system used a selection of techniques taken from other manufacturing industries such as textiles and automotive where inspiration for improving productivity within Toyota came from observing mass production processes used by Ford. It took another crisis such as the oil crisis of the 1970's to inspire a renewed interest amongst the automotive industries in the Western world to see what benefits TPS could bring about.

2.2.3 Just-in-Time

The previous sub-section mentions JIT as being an integral part of TPS and it is relevant for this study to further explore the concept by putting it into context. This will be achieved by explaining what JIT actually is by providing a definition and philosophy of both its purpose and requirements for implementation. This will be used to substantiate evidence that lean has evolved from TPS and JIT and how all three terms are the same and interchangeably used.

JIT can be defined as:

*"…a philosophy of manufacturing based on planning elimination of all waste and continuous improvement of productivity. It encompasses the successful execution of all manufacturing activities required to produce a final product from design engineering to delivery and including all stages of conversion from raw material onward. The primary elements of JIT is to have only the required inventory when needed; to improve quality to zero defects; to reduce lead times by reducing set-up times, queue lengths, and lot sizes; to incrementally revise the operations themselves; and to accomplish these things at minimal costs."* American Production and Inventory Control Society Dictionary, Cox and Blackstone (1998).

"*An approach that ensures that the right quantities are purchased and made at the right time and quality, and that there is no waste."* Voss (1986).

"*JIT enhances quality improvement, exposing defects and nonconformities while their causes are still fresh, and disallowing large, potentially defective lots."* Schonberger (1984).

*"JIT philosophy is associated with three constructs: total quality, people involvement, and JIT manufacturing techniques."* Hall (1987).

*"JIT is composed of three overall components, namely flow, quality and employee involvement."* McLachlin (1997).

"*An approach to achieving excellence in a manufacturing company based on the continuing elimination of waste and consistent improvement in productivity. Waste is then defined as those activities that do not add value to the product."* Goddard (1986).

*"Meet demand instantaneously, with perfect quality and no waste."* Harrison (1992).

Although the definitions appear general there are similarities between all of them, particularly that of providing quality, elimination of waste, meeting demand and

people involvement. It is through these definitions that one may conclude that JIT deals with providing quality products or service when the customer wants without any waste in the process. In order to meet these demands, the process relies on staff involvement.

Papadopoulou et al (2005) describes JIT as being the most significant part of TPS that led to the development of other complementary elements such as set-up reduction time, kanban system and small lot production which later became inseparable parts of the JIT system. This forms their analysis that JIT can be viewed as a complete manufacturing philosophy. Harrison (1992) agrees and further suggests the JIT concepts which began in manufacture have spread to all functions within businesses and to all industries. Hall (1983) states a JIT system must produce what the customer wants whilst producing products only at the rate it is needed and carried out using perfect quality. The goods must be produced instantly with no unnecessary lead time, without any waste of labour, material or equipment and produced by means of allowing for the development of staff. Fullerton et al (2000) concurs with Hall (1983) and views JIT as a philosophy that emphasises achieving excellence through the principles of continuous improvement and waste reduction with the aim of accomplishing two major objectives such as improving quality and controlling the timeliness of the production and delivery of products. By concentrating on quality Fullerton et al (2000) explains that companies should experience less scrap and rework and more effective communication amongst departments and staff will occur. Additionally, long-term commitments with fewer suppliers should take place with fewer inspections. Alternatively, other researchers describe JIT as being either ‘Big JIT’ or ‘Little JIT,’ where the first description is seen as a management philosophy that encompasses the entire organisational production activities and the latter is focused in the “pull” production mode and the use of the “kanban” communication and control system (Chase et al, 1995; Ho et al, 2001 and Stevenson, 2002). Therefore, in this circumstance JIT is viewed as a productivity technique.

This part of the section focuses on the findings of the JIT philosophy but it is necessary at this point to briefly mention the operational position that JIT

undertakes regarding it as a productivity technique. Ho et al (2001) and Hutchins (1999) describe JIT in this instance as consisting of a kanban or 'pull system' that advocates that production should be triggered by a pull signal from a downstream work centre when it has demand for component parts. The downstream work centre therefore serves as a customer for its upstream work centre meaning that the upstream work centre will not produce unless there is a demand or 'pull' from the down centre or customer. Ho et al (2001) and Hutchins (1999) also describe the alternative approach used in mass production organisations, as being a 'push system.' This is driven by the upstream workstation and pushes out the parts without any regard to the demand of its downstream workstation, meaning that excessive inventory is produced which is consequently seen as a major disadvantage of a push system. Although JIT can be seen at operational level as being a productivity technique it also contains a set of techniques aimed to support the JIT philosophy (Harrison, 1992 and Slack et al, 2004). These help in both contributing towards eliminating waste and relate to the way production is planned and controlled in a JIT system. There is no intention to explain these techniques as there are so many but some of these consist of using small simple machines, set-up reduction time, visibility, pull scheduling and kanban control.

If JIT is to be carried out effectively, there are certain requirements that must be used, where Harrison (1992) for example, identifies three essential elements such as the elimination of waste, total quality and people preparation. Although he includes continuous improvement as being one aspect that is an element of total quality, there are similarities amongst other researchers who share his view. Goddard (1986); Voss (1986) and Schonberger (2006) describe their three elements as being quality, continuous improvement and people involvement and therefore these will be explored in more detail.

Quality is more than a component of JIT but is seen as a critical issue in itself and must be addressed by every Company (Goddard, 1986). Hall (1983) agrees and he explains quality is often hard to define but it implies functionality, durability, reliability and pleasing appearance which come from the design of the product and also in what the customer uses and sees. In terms of achieving quality however, Harrison (1992) refers to it as being everything that is done in terms of

providing goods and services which meet customer demand and the way in which the Company's staff interact amongst each other. This also includes what the company expects from its suppliers.

Certain techniques are required in order to strive towards quality which includes the prevention and detection of defects throughout the Company (Harrison, 1992). This is done by using various techniques such as problem solving activities and visibility of problems such as error proofing devices. Effective management leadership and providing staff with sufficient training to support them into taking ownership and responsibility of their work without fear of reprimand if a problem occurs are equally important issues (Harrison, 1992 and Hall, 1983) . Removal of fear originates from one of Deming's (1992) principles regarding quality, who states:

*"No one can put in his best performance unless he feels secure."*

The second element required for JIT implementation is known as continuous improvement which originates from the Japanese term 'kaizen.' Imai (1986) was responsible for first introducing this term to the West as he explains a search of many earlier English language books and articles including those on the Toyota system failed to turn up any use of the word.

Imai (1986) explains that continuous improvement is the single most important concept in Japanese management and is the key to competitive success. Continuous improvement involves everyone including all levels of management and staff. He goes on to explain that continuous improvement covers the whole spectrum of business starting with the way the worker works in the Company, moving onto improvements in the machinery and facilities and finally affecting improvements in systems and procedures.

Imai (1986) includes continuous improvement as being part of group work activities which uses various statistical tools to solve problems where this involves the PDCA cycle (Plan, Do, Check, Act). This is a process that requires staff to identify problems, identify the causes, analyse them and test new

countermeasures and then establish new standards or procedures. Harrison (1992) agrees and adds that improvement towards zero defects is led by teams known as ‘quality circles’ who regularly meet and select problems themselves or by using small groups who temporarily meet as part of a work-based activity and focus on a pre-selected problem. Progress then results from using more improvement ideas known as ‘project by project improvement’ (Juran, 1988), meaning it is important to ensure that many ideas are being created and used by maintaining a high number of projects within the Company.

The third element essential for JIT success is people involvement or ‘respect for humans’ (Ohno, 1988). This can be described as having an equal role in the success of TPS as well as production efficiency.

An organisation’s culture is important in supporting the JIT objectives through the involvement of its staff and is achieved through team-based problem solving, job-enrichment, job rotation and multi-skilling (Harrison, 1992 and Slack et al, 2004). The intention is therefore to encourage a high degree of responsibility and ownership of the job. Fullerton et al (2000) expands upon this point and suggests JIT empowers employees by using their input in decision making and broadening their workplace skills and workers must be trained to be flexible and given authority to make day-to-day decisions so that they can react appropriately. Alternatively, Hall (1983) states JIT depends on very close team development and control where each member of staff should be aware of what needs to be done. Papadopoulou et al (2005) agrees and recommends communication is an area of major importance amongst the Company and its staff. Effective communication is also important because it emphasises on openness and aims towards eliminating distrust which also removes fear and anxiety amongst staff (Papadopoulou et al, 2005).

Conclusions can be made from the two sub-sections describing TPS and JIT where it appears there are differences between both approaches. Descriptions of TPS mention the use of operational techniques in its approach to eliminate waste including Jidoka, SMED and Pull. Although both systems seek to eliminate waste, JIT takes this one step further by including quality and continuous improvement in

its process. From the evidence supported by the academic literature it therefore appears that JIT has evolved through TPS by continuing to develop and perfect its process. Finally, on providing definitions for both JIT and lean one can formulate an analogy between them both. JIT focuses on quality, eliminates waste, meets customer demand and relies on people involvement. Lean also deals with the elimination of waste; it involves all areas of production and aims towards meeting customer demand. At this point of the study it may therefore be fair to suggest JIT and lean are the same package but differently labelled and the terms are interchangeably used.

### 2.2.4 Lean Philosophy

Monden (1983) explains the purpose of the TPS philosophy, otherwise known as lean, developed following the Second World War, is to lower costs, which is done through the elimination of waste. He describes waste as being everything not adding value to the product and is something that the customer is not willing to pay, which should therefore be eliminated. Alternatively, waste is anything other than the minimum amount of equipment, materials, parts and working time that are absolutely essential to production and waste (Taj, 2005). The term ‘Lean’ was first used by John Krafcik in 1988 who was a researcher with the International Motor Vehicle Programme. Krafcik used the phrase ‘lean production’ because unlike mass production it uses less of everything in the factory including space, human effort and time whilst bringing benefits to the organisation such as fewer defects and being able to produce a wider variety of products (Womack et al, 1990).

The term ‘lean’ is further described as moving towards the elimination of all waste so that a process is more efficient by being faster and operating at low cost (Slack, 2004). Although lean is considered to mean less, it can also mean ‘more’ for the organisation such as more staff empowerment, productivity, flexibility and quality whilst for the customer it means more satisfaction and basically implying that lean is focused on value-added activities (Comm et al, 2003). Lean is also described as being used as a strategy within manufacturing organisations to

improve competitiveness through cost reduction, quality improvement and the elimination of waste (Soderquist and Motwani, 1999).

Although 'The Machine that Changed the World' revealed the benefits of lean it wasn't until six years later in the follow-up publication 'Lean Thinking' (Womack et al, 1996) that the principles and concepts of lean were documented. The philosophy of lean was explained by Womack and Jones (1996) and the evidence was supported by case studies illustrating various organisations who had introduced the lean concept into their operational and strategic direction. They explained the philosophy as not just being a technique but rather a way of thinking where a culture is created so that everyone in the organisation continuously improves operations.

### 2.2.5 Lean Aims

It was Ohno (1988) whilst working for Toyota who identified the seven types of waste which can be found in any organisation and their reduction is a central part of the Lean philosophy (Womack et al, 1990; Liker, 2004; Slack et al, 2004 and Papadopoulou, 2005). Ohno (1988) recognised these as being: waste from over-production, waste of waiting time, transportation waste, inventory waste, processing waste, waste of motion, and waste from product defects. Additionally, Hall (1983) describes a lean organisation is made efficient through (1) eliminating waste of time where nothing sits, (2) eliminating waste of energy where equipment is operated only for a productive purpose, (3) eliminating waste of material by converting all of it to product, and (4) eliminating waste from errors so that re-work is unnecessary.

Karlsson et al (1996) suggests the most important source of waste is inventory and keeping parts and products in stock does not add value and should therefore be eliminated, further explaining inventory in the form of work in progress is especially wasteful and should therefore be reduced. Monden (1983) agrees and states inventory also hides other problems and prevents their solutions, although Shingo (1981) argues it is not advisable to eliminate inventory mindlessly but instead, the reasons for the existence of inventory must be removed first. One

way of doing this, as he suggests, is minimising down time in machines which is accomplished through preventive maintenance.

An eighth waste sometimes added to the list described by Deming (1992) is the waste of human potential who explains waste in terms of lost opportunities is immeasurable. An alternative view of the waste of human potential carried out in a study by Emiliani (1998) is that of human behaviour. Emiliani (1998) describes how the actions of staff can contribute to waste in the workplace and he offers a solution to this by focusing on how individuals can consistently behave in ways that create value with the goal of eliminating waste in both intra and interpersonal relationships. One may conclude including more wastes to the list already supplied by Ohno (1988) is a wasteful activity in itself although, but on the other hand, one may argue the seven wastes were originally developed with regard to dealing with inefficiencies found in manufacturing organisations. Therefore, the inclusion of an eighth waste can make the philosophy more meaningful as all industries, especially the service sector, rely upon staff for their organisational success.

Following on from the success of 'The Machine that Changed the World' (Womack et al, 1990), it was in their follow-up book 'Lean Thinking' published in 1996 that five principles for reducing waste and building lean enterprises were revealed (Emiliani, 1998 and Holweg et al, 2004). These are now synonymous with the seven wastes theory and Womack and Jones (1996) are often cited by academics when referring to the five principles which include:

1. Specify Value - this is defined by the customer and it must meet their needs including at the specified time and at the right price.

2. Identify the value stream for each product - the organisation must look at all of the steps that create value, activities that add no value but cannot be avoided and activities that add no value and can be avoided.

3. Make the value flow without interruptions - this means getting all of the activities that add value to flow without any disruption.

4. Let the customer pull value from the producer - it is important to respond to changing needs of the customer.

5. Pursue perfection - strive for perfection by repeating the process until perfect value is reached with no waste. Perfection is never achieved but striving towards it helps to eliminate waste and the customer's wish for maximum value is met.

Dahlgaard et al (2006) disagrees with Emiliani (1998) and Holweg et al (2004) regarding the fact it was Womack and Jones who were responsible for revealing the five principles. They state, however, the principles are not new but are exactly the same as the ones which were the guiding principles of craft production before mass production became the leading philosophy in the Western world. Dahlgaard et al (2006) further support their claim by describing that in craft production, the customer and his needs are in focus and production will not be started unless there is an order. Once an order is placed, all staff work to meet the needs of the customer and everyone understands what the consequences are in relation to the customer, the organisation and themselves. These aspects therefore contribute to the characteristics of the craftsmen who understand the purpose of their work and take pride in producing quality goods. These statements suggest the five lean principles are not the creation of Womack et al (1990) but have been observed by them whilst carrying out their research into the differences between Japanese and Western automotive production methods.

### 2.2.6 Lean Tools and Techniques

Lean consists of a series of tools and techniques which are designed to eliminate waste in any organisation although many of these originate from manufacturing industries (Slack et al, 2004). Papadopoulou et al (2005), supports this theory and explain throughout its evolutional path, lean is constantly being enhanced with a broad range of tools and the selection of lean tools and techniques to be used in a certain application must remain context specific. This means not all of the lean tools and techniques are necessarily vital for each case.

There are too many tools and techniques to describe each one within the context of this study, although on examination of academic literature by Papadopoulou (2005) and White et al (2001) there have been many attempts to provide a clearer understanding of them by means of classification. One of the most widely cited pieces of research is that of Shah and Ward (2003) who characterise lean manufacturing as a collection of techniques that work together at the same time to create a streamlined, high quality system that produces goods at the pace of customer demand with no or little waste. These tools and techniques are combined and placed into four categories known as lean bundles which consist of:

1. Procedures for creating JIT flow
2. Human resource development and empowerment practices (HRM)
3. Equipment management and preventive maintenance (TPM)
4. Quality control practices (TQM).

Shah and Ward (2003) explain which lean techniques are found in each of the four bundles. Techniques that fall in the JIT category focus on reducing waste such as lot size reduction, cycle time reduction and quick changeover. The HRM bundle consists of techniques which may include staff flexibility and self-directed teams. Techniques related to TPM include an emphasis on improving maintenance issues whilst TQM relates to continuous improvement and the sustainability of quality products.

Research has been carried out to discover if there are any differences in the amount of lean tools and techniques being adopted in large and small US manufacturing organisations. The results in the study by White et al (1999) which suggests specific JIT / lean management techniques might be appropriate according to manufacturer size. Their findings imply JIT is more advanced in large organisations and size influences the amount of techniques used. For example, 23.6% large manufacturers adopted ten JIT techniques compared to 13.8% of smaller organisations using the same amount. As part of their study White et al (1999) recommended requirements for JIT implementation include staff

involvement, training to develop necessary skills in lean techniques, open communication and decision making amongst all staff.

Research carried out by Shah et al (2002) concurs with the findings of White et al (1999). Part of their work was to examine the effects of three contextual factors including plant size, plant age and unionisation status on the effects of adopting 22 lean tools and techniques. Their evidence provides strong support for the influence of plant size on lean implementation compared to plant age and unionisation which has little impact. As part of their study Shah et al (2002) conducted a literature review to examine which of the lean tools and techniques used in manufacturing are commonly observed in the academic literature. Their findings suggest 'Pull system', 'Changeover Reduction techniques,' and 'JIT production' are most commonly used. However, these findings can be compared using data from twelve manufacturing and automotive case studies displayed in Table 2.1. Analysis of the data suggests the most common lean tools and techniques used in manufacturing are (1) kanban, (2) process mapping, (3) cellular / design flow, (4) changeover reduction, (5) JIT and (6) 5S.

Although 29 lean tools and techniques displayed in Table 2.1 have been identified in the research to have been used to various extents by the manufacturing and automotive case studies, the purpose of the research is to demonstrate which of the lean tools and techniques are most commonly used by this sector. Information described from Table 2.1 will be used later in the research to compare differences and similarities between lean tools and techniques used in the PS and those organisations using the NEC model.

**Name of Organisation**

| **Reference No:** | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 10. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tools / Techniques** | Toyota | PWC | Siemens | "USA" auto Co | Bosch | "ABC" Co | Nestle | Trico | Mitsubishi | "Co A" | "Co B" | "Co C" |
| Process Mapping | X | X | X | X | X | X | X | | | | | |
| 5S (Workplace Management) | X | X | X | X | | X | X | | | | | |
| Problem Solving | X | X | | X | X | | | X | | | | |
| Visual Management | X | X | X | X | | | | X | | | | |
| Poka Yoke | X | X | | | | X | | | | | | |
| Kanban | X | X | | X | X | | | X | X | X | X | X |
| Andon | X | | | X | | | | X | | | | |
| Takt Time | X | X | X | | X | | | | | | | |
| Jidoka | X | | | X | | | | | | | | |
| Levelling | X | | | X | | | | | | | | |
| Changeover Reduction | X | | | | | X | X | X | | X | X | X |
| Standardisation | X | X | X | X | | | | X | | | | |
| Standard Set-up | X | | | X | | | | | | | | |
| SMED | X | X | X | | | | X | X | | | | |
| Cellular Design/ Flow | X | X | X | X | X | | | | | X | X | |
| SPC | X | | | | | | | | | X | X | X |
| Design for Manufacture | X | | | | | | | | | X | X | X |
| Quality Teams | X | | | | | | | | | X | X | X |
| Gebenchi Genbutsi | X | | | | | | | | | | | |
| TPM | X | X | | | X | | | | X | | | |
| Pull System | X | | | | X | X | | | | | | |
| Milk-run | X | | | | X | | | | | | | |
| Just-in-Time | X | | | | | X | | X | X | | X | X |
| Single Piece Flow | X | | | | | | | | | | | |
| Continuous Improvement / PDCA / Kaizen Workshop | X | X | X | X | | | X | X | | | | |
| Policy Deployment | X | | | | | | | | | | | |

**Table 2.1 Lean Tools and Techniques used in Manufacturing and Automotive Industries**
*Source: Author*

The purpose of lean tools and techniques most commonly observed in Table 2.1 can be explained, according to Bicheno (2004) and Emiliani (1998):

1. ‘Kanban’ is a Japanese terminology meaning ‘sign’ or ‘signboard’ and it is a device used within a ‘pull system’ to provide instruction when the production of items or operations should be made. This is an effective way of reducing waste and avoids unevenness within the production cycle.

2. ‘Process Mapping’ is a technique that uses detailed representation to map in sequence a series of activities that form a process. Its purpose is to create a clear understanding through visualising each stage of the process and make improvements, usually through eliminating wasteful activities, without altering the function of the process.

3. ‘Cellular / Design Flow’ uses a defined workspace known as ‘cellular layout’ to group similar tasks, products and processes together. The resources are formed into cells in order to maximise efficiency by reducing work in progress, set up times and throughput times.

4. ‘Changeover Reduction’ is a process of switching from the production of one product or part to another in a machine or a series of linked machines by changing parts, moulds or fixtures. Changeover time is measured as the time elapsed between the last piece in the process which has just been completed and the first good piece from the process after the changeover. Single Minute Exchange of Dies (SMED) is the most commonly used technique in this process because it aims to reduce changeover in the least amount of time possible.

5. ‘JIT’ is a system of production that makes and delivers only what is needed, just when it is needed and in the amount needed. JIT aims for the total elimination of all waste to achieve the best possible quality, lowest possible cost and use of resources, and the shortest possible production and delivery lead times.

6. ‘5S’ (workplace management) is a term originated from Japan and it is a five point framework all beginning with the letter ‘S’ to describe workplace practices contributing to visual control and production efficiency. 5S is sometimes referred as 5C or CANDO although they all share the same principles. When translated into English 5S means:

- Sort - throw out items that are no longer used.
- Straighten - arrange items that can be easily located.
- Sweep - tidy up the work area on a regular basis.
- Standardise - maintain standard work processes.
- Sustain - ensure everyone participates in 5S practices.

2.2.7 Benefits of using Lean within Manufacturing Organisations

This sub-section highlights the benefits of lean implementation and provides examples from the experience of researchers and those obtained from three case studies in manufacturing organisations. Benefits of lean implementation include:

- Optimal use of skills from workforce
- Ability to manufacture more products at lower cost.
- Higher quality products
- Less input at every stage in production process.
- Increase competitiveness advantage

Regarding the impact of lean on staff, Mathaisel et al (2000) state lean makes optimal use of the skills of the workforce by giving them more than one task, by combining direct and in-direct work and by encouraging continuous improvement activities. This means the organisation is more able to manufacture a greater amount of products at lower costs and higher quality with less of every input compared to traditional mass production. Dankbaar (1997) agrees and suggests the organisation will become more competitive whilst using less human effort, less space, less investment and less development time. Bhasin et al (2006) concurs and state there is a sizeable amount of literature reporting lean aids

competitiveness based on empirical evidence. They go on to quote Sohal et al (1994) who explains a study of 72 Australian manufacturing companies revealed 66% of them felt a competitive advantage had been gained by using lean with the greatest improvement stemming from market competitive positioning.

Sohal (1996) describes the experiences of an Australian manufacturing company called Trico spanning over a ten year period from 1984 to 1994. In order to directly compete against Japanese manufacturers Trico had to overcome inefficiencies in production operations, a high level of inventory, poor quality and an inflexible manufacturing system based on mass production. Trico then adopted a variety of unspecified lean tools and techniques, although JIT flow and HRM are documented as being two methods, across all areas of its operations. Improvements gained over this period of time saw inventory being reduced by over AUS$150,000 and inventory turnover improving from 4.5 to 6.5 per year. Substantial and consistent improvements were made over the ten year study in all areas of the organisation including an increase in production volumes by 30 - 40%. At the start of the project Trico was threatened with extinction from foreign competition but by the end of the 1980's they were exporting over 50,000 windscreen wiper assemblies per year to the USA. Changes across the organisation were readily accepted by staff through the use of improved communication and staff involvement with decision making. For example, staff were consulted and involved in making decisions and out of 131 changes that took place over five years, 86 were initiated by shop-floor staff.

Motwani (2003) conducted a case study examining a lean implementation experience at a medium-sized automotive manufacturing company in the USA. The company's motivation to adopt lean was out of necessity to remain competitive with their focus being on reducing costs in order to increase profits. The company used lean tools and techniques specifically in continuous improvement activities, after initially liaising with a lean consultancy. At the end of the three year study manufacturing batch sizes reduced from 30 days to 16 days or less and continued to fall. On average, set-up times in most areas of the company were reduced by half. Five working prototypes were reported to have

been developed for a foreign customer in ten weeks which previously took ten months.

Domingo et al (2007) conducted their case study research by examining lean tools and techniques conducted in an assembly line of the Bosch factory, located in Spain. Before the project was conducted, there were problems in the supply to the lines, causing waste. For example, the available storage space in the assembly workplaces was insufficient and staff had to walk out of their workplaces to replace material. In order to address these problems, the company adopted some lean techniques including 'Value Stream Mapping' (VSM) and JIT flow. VSM is a lean visual technique used for identifying and eliminating waste and improving the materials flow (Womack et al, 1996 and Sullivan et al, 2002). In a period of three months the stock total was reduced from 17,303 parts to 16,020 parts and stocks to the intermediate warehouse were reduced from 20 to 10.7 days, dock-to-dock time from 22.8 to 17.1 days and lean rate was increased from 0.33 to 0.44%.

### 2.2.8 Barriers to Lean Implementation

This sub-section provides a description of barriers to lean implementation from the experience of researchers and those obtained from three case studies in manufacturing organisations. In comparison to the benefits that may be gained from adopting lean, there appears to be less documentary evidence amongst the academic literature when describing these barriers. Barriers include:

- Lack of management direction, planning and project sequencing
- Lengthy transformation process to become a lean organisation
- Organisation requires strategic alignment
- Corporate culture
- Inconsistent and changing requirements from external sources
- Technical limitations within organisational processes

The most common difficulties when implementing lean are a lack of direction, a lack of planning and lack of adequate project sequencing (Bhasin et al, 2006).

Papadopoulou (2005) and Liker (2004) support this and add that the transformation process to creating a lean organisation requires a long time to develop and corporate culture is often blamed for numerous failures. However, Bartezzagni (1999) and Schonberger (1996) contest this and argue it is important to introduce an alignment in the ways the members of the organisation think and behave to reap the full benefits of lean. Henderson et al (1999) supports this view by explaining it is essential for the right culture to exist amongst the organisation's employees in order to enjoy the full benefits of lean.

A research study was carried out by Mathaisel et al (2000) to examine if the success obtained from lean in the US aerospace industry could bring value to the military and commercial aerospace industry. Although many of the respondents in the survey admitted to making improvements in their organisations they also experienced problems. For example, when asked what factors may discourage a truly lean operation most of the respondents indicated "inconsistent and changing requirements from customers, government and prime contractors" and "technical limitations in processes and technologies."

In a research study carried out by Sohal (1996) regarding the Australian manufacturer Trico, there were problems that were encountered during their transition to becoming a lean organisation. For example, difficulties were experienced in the initial stage of establishing work teams which were primarily due to management's high expectations of the teams without providing adequate support. Poor understanding of the team structure and leadership training were other major problems which Trico experienced. These problems were overcome, however, by establishing support groups between the work teams and the management resource group. It was difficult to change the attitudes of staff on the shop-floor and to make them realise that the way they had been doing their job for the past 20 years was not necessarily the right way and there were alternative and better ways of performing the task. Developing and maintaining discipline on the shop-floor was a problem where this referred to the staff's inability to follow instructions in only producing the quantities required. Sohal (1996) states educating staff was therefore critical in overcoming the problems which was an area where Trico invested heavily. He adds that the management learned very

early in their transition to lean that to implement change successfully, staff must take an active part in the change process otherwise the proposed changes will be resisted.

In their research study, Domingo et al (2007) does not mention any problems encountered with Bosch's transition to lean, although they do admit to caveats. They explain improvements cannot be static and isolated but must remain part of a continuous improvement strategy. On the subject of adopting lean tools and techniques, they state every organisation is different and needs to adopt these tools to its particular manufacturing characteristics, layout, inventory, flow charts and organisation.

### 2.2.9 Caveats or Perceived Limitations

Throughout its development, lean has received its share of caveats or criticisms from both within and outside the lean movement. Although this category is not clear these perceived limitations can be explored through the following themes. They include:

- Lack of contingency
- Focuses on operational functions rather than strategy
- Difficulty in dealing with unplanned occurrences
- Lack of buffers can cause limitations within production
- Reduces staff empowerment
- Health and Safety implications

Lean is criticised as failing to deal with a lack of contingency where Hines et al (2004) state for many companies the main focus of lean is still on the shop-floor and their search for competitive advantage have still yet to rely on the more recent lean integrative approaches. Holweg et al (2001) agrees and describes that particularly within the automotive industry lean still remains a shop-floor dimension and only focuses on optimising the car assembler and first level of the supply chain. They go on to suggest the ironic situation of lean automotive manufacturers

in Europe produce into the highest level of finished stocks in Europe, where in 2004 there were $18billion of unsold vehicles.

Waller (1999) identifies risks within lean and because it involves a disciplined workforce, few suppliers and minimum inventories it can be expensive when there are any unplanned occurrences. Cooney (2002) states there are some limitations with the lean concept. He explains lean depends on production levelling throughout the supply chain to maintain JIT flow and any disruption to this is easily caused by short term contracts with suppliers and changing demands from customers. Fairris et al (2002) agrees and explains production processes require buffers. In mass production these include stocks of parts, back-up machinery and extra workers to deal with contingencies in demand. Alternatively, lean attempts to minimise the use of buffers throughout the JIT production scheme to expose weaknesses in the system and act accordingly. Fairris et al (2002) state buffers provide workers with discretion in their pace of work where lean forces workers to work harder. This may risk their sense of fairness in sharing shop-floor rewards and cause reluctance by workers in co-operating with management.

Berggren et al (1991) identifies Health and Safety implications with the work place used in lean. They visited a number of lean auto manufacturers in the USA and found increasing Health and Safety complaints related to the intense pace, repetitive job tasks and long hours. Their study revealed overall injury rates occurred three times more in lean manufacturers than in other US plants.

### 2.2.10 Summary

The academic literature suggests lean has evolved from its TPS origins and is continually developing where interchangeable names for the Lean philosophy are used as part of its transition. Lean is used by manufacturing organisations to eliminate waste from their processes which is achieved to provide benefit for the end customer in terms of ensuring quality, reducing cost and delivering only what is required and when. Policy deployment is incorporated as part of the manufacturing organisation’s long-term strategy to ensure strategic alignment is maintained and improvements are achieved by all levels of staff to identify where

the hidden wastes lie within their processes using a system called process mapping.

- Tools and Techniques: The amount and range of lean tools and techniques is vast and they work together to create a streamlined system to ensure quality, productivity and the rate of goods according to customer demand is maintained.

- Barriers: Although the manufacturing case studies suggest the Lean philosophy can help achieve benefits there are some barriers to its implementation. Corporate culture and lack of management direction and project sequencing are reported as problematic to lean implementation although these can be avoided if policy deployment is incorporated within the organisation's strategy. Lean also takes a long time to become established throughout the organisation and is confounded by inconsistent and changing requirements from external sources.

- Caveats: Lean is criticised as focusing only at operational level rather than incorporating the organisation's strategy because the range of tools and techniques are designed for use on the shop floor. A contradiction exists with this finding as policy deployment has already been identified by academic literature to maintain strategic alignment if it is incorporated as part of the manufacturing organisation's strategy. The academic literature also suggests lack of buffers within the production process causes staff to work harder and reduces their discretion in their pace of work which may lead to poor staff morale and increased Health and Safety issues due to the increased work pace. This finding may be challenged as the academic literature suggests the success of lean depends on the involvement of all levels staff throughout the organisation by incorporating continuous improvement activities. The organisation is then able to make maximum use of its skilled workforce and use less human effort as well as less space, investment and development time.

## 2.3 Public Sector

The focus of the study is in LG but because there is a limited amount of work that has been carried out in this sector it is relevant to discuss what has so far taken place in health care. It is appropriate to focus on health care as both sectors are part of the PS and have similar processes although LG is more complex and varied as the section will reveal.

The sub-section begins by investigating drivers for change within the PS, what constitutes productivity within the sector including related measurement issues and how it differs to manufacturing. It will go on to examine existing lean based models within health care and LG and how they compare to the lean model introduced and used by Toyota. The chapter moves onto study which lean tools and techniques are used within health care and LG in comparison to manufacturing and then progresses onto examining the effects of lean in the PS. The effects will focus on four PS case studies looking at both benefits and barriers to using lean. Critical analysis of the academic literature is provided throughout the section and the chapter concludes with a summary of the salient issues.

The term 'Public Sector' consists of organisations that deliver goods and services of the Government at local and national level. Although the PS varies across the world it usually consists of: education, electricity and gas, public transportation, fire services, police services, health care, water services, waste management, housing, social security, welfare and children (Fryer et al, 2007 and Ghobadian and Ashworth, 1994). The literature review will however focus on health care and LG. Hodgkinson (1999) describes LG as providing a range of services from fairly unskilled outdoor manual work to professional services such as planning. Although national policy is set by Central Government, LG, otherwise known as Local Authorities or Councils, have a wide range of powers and duties where they are responsible for all day-to-day services and local matters that are funded by government grants, council tax and business rates (www.direct.gov.uk).

2.3.1 Drivers for Productivity Change within the PS

Although lean is reported to have brought benefits to the automotive and manufacturing industries such as Toyota (Liker, 1997) and Trico (Sohal, 1996) it is only recent that it has been introduced to the PS, especially within the UK. At the beginning of this research Radnor et al (2006) reported the most significant motive for the introduction of lean into the PS was due to the Gershon Report (2004). This report focused attention on productivity improvements aimed towards the PS including Central and Local Government plus the National Health Service (NHS). It set out new requirements for efficiency and customer focus for the PS. The study by Radnor et al (2006) into the use of lean in the Scottish Public Sector is significant as it revealed the Gershon Report (2004) is the most common motivator for change although subsequent Government Spending Review reports released in 2007 and 2010 have since perpetuated this momentum. This section focuses on the Gershon Report (2004) as being the main policy driver for productivity change as it is documented in the academic literature to have played the most significant role in PS productivity reform. The section does however recognise other significant influences for productivity change.

In the 2003 Budget the Government announced they would be making a cross-cutting review to identify the possibility of making efficiencies in the PS and release resources to 'front-line' services such as hospitals and schools and deliver further improvements in the performance of the entire sector. This review, commissioned by the Government, was led by Peter Gershon and known as the Gershon Report - "Releasing Resources to the Front Line: Independent Review of Public Sector Efficiency" (2004). The report was to feed into the 2004 Spending Review and make recommendations for Ministers in an attempt to make realistic departmental efficiency targets for periods between 2005-06 and 2007-08. This has now followed on to be included in subsequent Spending Reviews such as the Comprehensive Spending Review (2007) which focuses on efficiency targets for 2008-9, 2009-10 and 2010-11.

The Gershon Report (2004) identified efficiency measures aimed towards making overall annual savings of £21.5 billion across the entire PS meaning each department had to make 2.5% cash savings. This meant cash savings for LG were

to be £6.45 billion and £6.47 billion for the NHS. At the time of the Spending Review (2004) the Government announced that the role of monitoring the efficiency savings, in accordance with the Gershon Report's (2004) definition of efficiency, were to be performed by each department and be co-ordinated by the OGC (Office of Government Commerce). Efficiency was defined in the report as 'making best use of the resources available for the provision of public services.' Recommendations were made for efficiency gains and included six priority areas such as (1) back office functions, (2) procurement, (3) transactional services, (4) policy, funding and regulation of devolved public services, (5) policy, funding and regulation of the private sector and (6) productive time.

The Gershon Report (2004) devised a set of proposals to be worked in conjunction with the six priority areas for efficiency gains indicating how each department would work towards their targets. The agreed targets for the Department of Health were to make annual cash savings and release resources for front-line activities. As part of the programme the department planned to make better use of staff time such as improving the way in which appointments for patients would be made and ensure the NHS could make better use of back office services such as finance, I.T and human resources. The focus in LG was also on annual cash savings and to release resources to front-line services. Efficiencies were anticipated with approximately 40% of the savings to be delivered through schools, 10% through policing and 35% through procurement in other services such as adult social care, social housing, children's services, highways and waste. Further savings were also expected to be delivered through local authority back office functions and transactional services and improvements in staff productive time.

A new change in Government brought about in 2010 has seen the introduction of the Spending Review Framework (2010) that proposes changes in the way public spending will be carried out in the UK with immediate effect. This is in response to the need for reducing the budget deficit caused through the global economic crisis, where the International Monetary Fund (IMF) forecast, without urgent action the debt interest will rise to approximately 90% of GDP by 2015. The Government state in the report that the majority of the deficit reduction will be achieved through making cuts in public spending rather than increasing taxes where savings of

£6.25 billion will be made within the first year. Although it is too soon to report of any significant reforms it is predicted that the Spending Review Framework (2010) will have implications for the PS towards meeting a drive in efficiency and value for money. For instance, the Government states it has plans to deliver a 'step change' in PS productivity and create value for money where they recognise 'the importance of how they are seen to spend money rather than how much is spent.'

Before the Gershon Report (2004) was introduced, Stahr (2001) explains the NHS saw a range of other quality initiatives including Resource Management, Clinical Audit, Evidence Based Medicine, Patient Focused Care, Investors in People, ISO 9000, Clinical Governance, Controls Assurance, NHS Plan and Working Lives. Stahr (2001) states these either focus on technical or generic quality initiatives. Carr and Littman (1993) state many quality initiatives have dominated the NHS. These approaches have led to a mixed reaction amongst health care staff because they appear to be ineffective and short-lasting whilst only temporarily dealing with a problem (Carr and Littman, 1993). In order for improvement initiatives to have any significant impact they need to affect the organisation's culture and a systemic approach such as continuous improvement can be used to achieve this (Stahr, 2001). This suggests lean is appropriate for use in the NHS as it focuses attention on the needs of the customer, uses continuous improvement and involves everyone in the organisation.

The Gershon Report (2004) and its subsequent reports have prompted the emergence of quality initiatives in the PS where one of these is the 'No Delays' programme used in the NHS (www.institute.nhs.uk). This is the Institute for Innovation and Improvement's programme to help NHS Trusts achieve the Department of Health's objective of reducing delays. The programme is significant because it focuses on patients who wait unnecessarily for services and aims to reduce waiting times for treatment within 18 weeks of GP referral. The Institute for Innovation and Improvement state they use lean because they believe it is appropriate for use in the NHS as it eliminates waste, improves flow and gets the right things to the right place, at the right time and in the right quantities. The Institute refers to the five principles quoted by Womack et al (1996) when describing the model that is used. Some of these are tools that address workplace

management, standardisation, visual control and elimination of non-value added steps so that improved flow, elimination of waste and customer expectations are exceeded.

### 2.3.2 Productivity within the PS

In order to discuss the relevance of lean in the PS it is important to explore how services differ from manufacturing organisations. This section addresses these differences and examines what productivity means to the PS and how it is measured within the sector.

A study by Rosen (1990) identifies four characteristics that make services different to manufacturing industries which include the inseparability of production and consumption, intangibility, perishability and heterogeneity. Some of these apply to service industries in general such as airlines, restaurants and hotels but are also relevant in the PS and for the purpose of this review. In the case of LG all four characteristics apply due to the vast and varied range of service provision.

Inseparability of production in the PS means that production and consumption take place at the same time and the customer is present during the production of the service. In a health care environment this could mean a patient receiving treatment in the form of a medical or surgical procedure or investigation. Canel et al (2000) describes that unlike manufacturing where the product can be inspected before delivery, services must rely on a series of measures to ensure the consistency of output. This is because services do not always deal with a physical product to inspect. An example of intangibility in services can be described as performances, ideas and concepts where the customer must often rely on the reputation of the service company (Zeithaml et al, 1985). These less measurable aspects may have the potential to influence the customer's expectations of quality. An example of this can be explained by a patient needing treatment and choosing which hospital to attend. Their choice may be determined by the hospital's reputation. This is different in manufacturing where the customer is able to see and test the performance of the product before making a purchase. Perishability refers to the concept that goods in a service environment cannot be saved or inventoried

(Benson, 1986). Examples of this for the PS may include unfilled appointment times in a hospital or council department. The inability to store services is a major problem for most service industries and is seen as an opportunity lost. Canel et al (2000) supports this by explaining perishability leads to the problem of synchronising supply and demand meaning customers may be forced to wait or even not being served at all. In terms of heterogeneity in the service sector, the quality of the service can vary from each day, each provider and each customer (Canel et al, 2000). This affects the measurement of variability of different performance types meaning a consistency of quality can be difficult as a result.

A study by Lee (1990) reveals there are similarities between manufacturing and service industries. He explains whilst the characteristics of manufacturing and PS are different, many administrative functions involving paperwork are very similar to assembly line procedures. He also states work is repetitive and most administrative processes do not demand high quality decision-making activities. Jarrett (2006) agrees and explains the service industry must maintain distribution and inventory systems similar, although more complex than those in the manufacturing industry. It is suggested that many service organisations are now experiencing the same kind of competition that manufacturers have faced as a result of deregulation (Lee, 1990). This has become evident in the PS where the Government has introduced reforms that allow people to choose where they go for treatment and funding follows the patient.

Although academic literature reports more widely on the importance of productivity in manufacturing organisations, there is very little empirical research conducted in the PS however more information is provided when discussing services in general (Johnston et al, 2004; Fryer et al, 2009 and Jaaskelainen et al, 2009). Furthermore, in the case of this review most academic information within the PS derives from health care rather than LG although parallels can be made. Martin et al (2001) state most research attention has been focused on the definition of service productivity and it has also been concerned with internal rather than customer or client productivity. They suggest, however that the customer often plays a dual role as both customer and co-producer of the service and any measure of service productivity must include some customer component as they

can have a significant impact on the quality of the service and overall productivity. Productivity is defined as a representation of the ratio between output and input and is considered to be the key success factor in every organisation (Sink, 1983). It is used by measuring an amount of products or services being produced against the time required for production. When productivity is applied to LG Faucett and Kleiner (1994) describe it as:

"E*fficiency with which resources are consumed in the effective delivery of public services*."

The definition suggests quality is part of the production process as well as quantity and it relates the value of all resources used in the process to the output or outcome which is the public service being delivered or the end result. Faucett and Kleiner (1994) go onto suggest improved productivity leads to better services being provided either at the same unit cost or the same quantity and quality of services at less unit cost. Jaaskelainen et al (2009) agrees and adds productivity in the PS is closely related to efficiency, effectiveness and performance. Efficiency can be described as the utilisation of resources, effectiveness relates to the ability to reach an objective or which desired results are obtained and performance is part of the organisations' level of productivity (Tangen, 2005). Measuring productivity within the PS is considered to be difficult and complex due to the multi-faceted and diverse range of services that are provided (Ghobadian et al, 1994, Jaalskelainen et al, 2009 and Fryer et al, 2009). Ghobadian (1994) suggests the problems are intensified due to services having a combination of tangible and intangible outputs or outcomes, customers rarely pay an economical price for services, there is a no profit measure, nor is there an apparent link between services and cost to the electors. Jaalskelainen et al (2009) adds the main reasons for the difficulty in measuring PS productivity are due to variations in output quality, variations in service demand and the time difference between immediate outputs and final outcomes. Technical challenges specific to each department and political interference at Local and Central Government level adds to the difficulty in productivity measurement (Hodgkinson, 1999).

When measuring productivity Fryer et al (2009) states there is no single framework that suits every PS organisation and when they are given the choice to decide what to measure, they prefer to focus on characteristics which they have greatest control. Therefore, routine services such as waste collection and road maintenance would choose to use technical efficiency measures to evaluate the volume of output achieved through a set volume of inputs. In comparison, professional departments such as libraries and planning would tend to use social effectiveness or quality of service measures (Dalton and Dalton, 1988). Productivity in the PS should not only concentrate on efficiency measures but also focus on what services achieve and how well they meet customer demand (Ghobadian et al, 1994). Fryer et al (2009) identifies the use of performance indicators, more commonly known as 'key performance indicators' (KPIs) are widely used throughout the PS as a measurement tool which consists of four types: (1) output which is used to measure how much is produced, (2) welfare which is used to measure the value to the end customer, (3) performance which measures how the services are being produced and (4) composite indicators that combine all three of the above indicators (Stevens et al, 2006). Although this measurement system is broadly used across the PS, Fryer et al (2009) state the problem with this system is there is no set amount of KPIs that can be used and departments often focus on too many targets which may result in having a detrimental effect on performance and quality. As part of the Comprehensive Review (2007) PS organisations are required to report issues of productivity in accordance with the Government's 'National Indicator Set' which is a framework which consists of 198 indicators that focus on the delivery of outcomes. The framework states each PS organisation should prioritise up to 35 of the indicators, negotiated through Local Area Agreements, and will be complemented by 17 statutory targets based on education attainment and early years. The purpose of the framework is to enable Central Government to monitor the delivery of outcomes across all PS partnerships such as LG, police, fire and health care organisations (HM Government, 2007).

Although there is little knowledge into measuring service productivity in the PS, there has been some research carried out by Swedish academics who have investigated how a performance measurement system has been designed to

measure changes towards lean in health care services. The study by Kollberg et al (2007) integrates literature from the Health sector and the Lean philosophy in order to understand whether lean is applicable to health care and it also identifies KPIs that measure changes towards this philosophy. This measurement system is called the 'Flow Model' which aims to follow an individual patient's path through the health care system by focusing on eight measures, all which measure a certain date or time in the patient care chain. The aim of the model is to prevent long waiting times and delays and also to compare the performance between departments over certain periods of time. Their findings conclude that lean can be applied to the Health sector and that the 'Flow Model' is a suitable tool to support its success although they do suggest the model needs to be balanced with other measurements in order to receive a complete picture of lean performance.

This section suggests differences exist between manufacturing and the PS organisations in terms of how productivity is defined and used between the organisations which may affect the transferability of lean into the PS. Terms such as efficiency, effectiveness and performance are used within the PS rather than productivity because they more accurately reflect the focus and type of services being provided. Four characteristics have been identified in the PS that include inseparability, intangibility, perishability and heterogeneity which are absent in manufacturing. Productivity in manufacturing organisations is easily measured using tangible inputs and outputs whilst the PS in comparison is complex due to variations in demand, quality and the time difference between outputs and outcomes being provided from its vast range of services. The inclusion of quality as well as quantity being part of its production process further complicates PS productivity measurement. There is a limited amount of academic literature to describe how productivity is measured in the PS apart from the use of KPIs and departments tending to focus on characteristics specific to their type of service provision.

### 2.3.3 Existing Lean-based Models

A search of the academic literature reveals there is a lack of existing lean models being developed and used within the PS particularly within LG and examples will

therefore be used from health care. This section provides evidence and comparisons of lean-based models and approaches used by three health care providers and a business consultancy providing guidance to LG departments in comparison to the lean model developed by Toyota which is provided as a benchmark for comparison (Table 2.2). The health care examples provided in Table 2.2 are case studies from the USA who are Virginia Mason Medical Centre (VMMC) and Theda Care together with Flinders hospital from Australia. Vanguard business consultancy is used as the fifth case study example whose guidance has been used across LG departments in the UK as commissioned by the Office of the Deputy Prime minister (ODPM).

Table 2.2 consists of categories containing a range of applications found pertinent in Toyota's interpretation of the lean model known as TPS and is described by Liker (2004). These categories consist of a model name, model design, philosophy, approach, goal, process, high level diagnostic, measures, tools and techniques, organisational structure, culture, training and sustainability. A brief description how each application is used within Toyota's lean model is provided in Table 2.2 and cross comparisons are linked with each of the four PS case study examples to illustrate how the model has been adapted and applied within their organisations. Evidence of how existing lean-based models have been adopted and used in the four PS organisations has been obtained through case study examples described in the academic literature (Nelson-Peterson et al, 2007; Womack et al, 2005; Jones et al, 2006 and ODPM, 2005):

Model name:

All of the organisations displayed in Table 2.2 use a lean model name to reflect their focus of activity such as Theda Care Improvement System (TIS) and all model interpretations claim to be based on the Lean philosophy.

Model design:

Liker (2004) explains Toyota's model design is based on '4P' comprising of (1) Philosophy which includes long term thinking and strategy; (2) Process where the aim is to eliminate waste; (3) People and Partners which relies on respect and long-term investment in employees; (4) Problem solving conducted through

continuous improvement and learning. Each of the health care examples share similar model designs with Toyota apart from Vanguard whose model focuses on problems within the system's process using (1) Check (2) Plan (3) Do which is a variation of Deming's PDCA.

Philosophy and Approach:

All case study examples adopt a philosophy and lean approach whilst recognising their activities must focus on customer needs whilst eliminating waste from each stage of the process.

Goal:

The most common goals shared by all of the organisations in Table 2.2 are quality, cost effectiveness and delivery otherwise classified by the PS examples as 'increased productivity.' Although Toyota appears to be the only case study example to include morale as one of its goals this aspect is later provided by the PS organisations as being important when discussing their approach to organisational culture.

Process:

All of the PS case study examples with the exception of LG departments using Vanguard's guidance are internally led and use lean leaders as part of their improvement process.

High Level Diagnostic Tool:

There is no evidence to suggest whether the health care providers illustrated in Table 2.2 utilise a high level diagnostic tool at senior management level although Vanguard claims to incorporate one within their model.

Measures:

Process mapping is used within all case study examples at departmental level to analyse what is currently happening within a specific process and problem-solving is then used to make improvements in the process towards the future state.

Tools and Techniques:

Although a full range of lean tools and techniques are used in the TPS model which are included in all four parts of the lean bundles described by Shah and Ward (2003) only a small proportion are used in the PS case study examples with a maximum of fourteen being used by Virginia Mason health care provider. The only lean bundle to feature in all of the PS organisations is HRM although the characteristics of JIT and TQM are present in each of the health care case study examples. Despite the TQM bundle featuring in all of the health care examples there appears to be a general lack of technical lean tools and techniques used amongst them all. Liker (2004) identifies the most important lean tools and techniques to feature heavily in the TPS model are standardisation, visual management, levelling, continuous improvement and policy deployment.

Examples are provided in Table 2.2 to describe how the PS case studies use the tools and techniques featured significantly in the TPS model although the only method to feature in each of the displayed organisations is policy deployment. This is a not a lean tool or technique but it is a quality planning system used to strategically align senior management decisions alongside operational processes and it is also referred to its Japanese term 'Hoshin Kanri' (Bicheno, 2004). Consequently, its aim is to communicate objectives and achieve commitment from all levels of the organisation. Dale (1990) defines it as:

*'a process of developing plans, targets, controls and areas of improvements based on the previous level's policy and on assessment of previous year's performance.'*

Organisational Structure:

Organisational structure within LG and two of the health care case study examples are tiered which is typically found across all PS organisations. However, organisational structure is flattened within Toyota and exists in only one PS case study example which is VMMC. This type of structure is recommended by Toyota to effectively enable all levels of staff to make decisions through teamwork.

Organisational Culture:

The most important feature of the Lean philosophy is organisational culture which Toyota believes to be the most difficult area to develop and sustain as it takes several years for it to be embedded within the organisation (Liker, 2004). Table 2.2 illustrates the differences between all of the case study examples regarding organisational culture where the shared belief in this category appears to be staff empowerment, involvement at all levels and job security. Senior management support appears to be an important factor by each of the case studies which also coincides with the requirements of policy deployment.

Training:

Table 2.2 displays that all of the case study examples consider training to be an important feature in their approach to lean which is carried out routinely in one week sessions across all levels of the organisations. The use of cross functional teams specific to the work area is present in each of the case studies whilst the use of internal lean leaders differs slightly in each PS example. The role of the lean leader according to the TPS model however is integrated within a supervisory capacity as part of the daily routine.

Sustainability:

Table 2.2 shows Toyota is the only sustainable organisation to utilise lean throughout the organisation where they claim the process takes at least ten years to complete (Liker, 2004). Although differences and similarities exist amongst most of the PS case study approaches to lean, the mindset appears to be the same where in an attempt to become sustainable organisations, their approach is slow and steady with a gradual and partial use of lean before a move towards extending it throughout the remainder of their organisations.

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Industry**:<br>Automotive manufacturer | **Industry:**<br>Health care | **Industry**:<br>Health care | **Industry**:<br>Health care | **Industry:** Commercial Business Consultancy that works with the service industry. Examples used in the study follows work completed by them in three LG departments. |
| **Focus**:<br>Product | **Focus**:<br>Patient | **Focus**:<br>Patient | **Focus**:<br>Patient | **Focus**:<br>Multi-service focused |
| **Case study examples**:<br>General automotive production | **Case study examples:**<br>Patient centred activities - mainly ward based. | **Case study examples**:<br>Improved triage times.<br>Reduced time to complete clinical paperwork following patient admission.<br>Improved medication distribution time. | **Case study examples**:<br>A&E waiting times.<br>Bed management.<br>Team based care. | **Case study examples**:<br>Tees Valley Housing - housing repairs.<br>Preston City Council - rent collection.<br>Leeds South East Homes - re-housing. |
| **Model name**:<br>Toyota Production System, otherwise known as TPS. Origin of lean. | **Model name:**<br>Virginia Mason Production System (VMPS) model based upon TPS model. | **Model name**:<br>Theda Care Improvement System (TIS) based upon Lean philosophy. | **Model name:**<br>Redesigning Care based upon Lean philosophy. | **Model name**:<br>Systems Thinking based upon TPS and adapted for services and the PS. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Model design**: '4P' – consists of: (1) Philosophy (long-term thinking), (2) Process (eliminate waste), (3) People and Partners (respect, challenge and grow them), (4) Problem Solving (continuous improvement and learning).<br>Toyota describe this as: Challenge, kaizen, respect and teamwork and gebenchi genbutsi. | **Model design**: Consists of: (1) Strategy, (2) Process (eliminate waste), (3) Staff commitment (no lay-off policy), (4) Problem Solving (continuous improvement and learning). | **Model design**: Consists of: (1) Strategy, (2) Process (eliminate waste), (3) Staff commitment (no lay-off policy), (4) Problem Solving (continuous improvement and learning). | **Model design**: Consists of: (1) Strategy, (2) Process (eliminate waste), (3) Staff commitment (no lay-off policy, avoid blame culture), (4) Problem Solving (continuous improvement and learning). | **Model design:** Steps in the model consist of:<br>(1) Check (what is the purpose of the system, what are its core processes, capability - what are the system and its processes predictably achieving, system conditions - why does the process or system behave in this way)?<br>(2) Plan (what needs changing to improve performance, what action could be taken with what predictable consequences, against what measures should action be taken to ensure the organisation learns)?<br>(3) Do (Take the planned action and monitor the consequences versus prediction and purpose). |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Philosophy**: Customer comes first, Toyota continually seek to provide quality products at a reasonable price to satisfy customer needs.<br>*"All we are doing is looking at the time line from the moment the customer gives us an order to the point when we collect the cash... we are reducing that time line by removing the non-value-added wastes"* (Ohno, 1988). | **Philosophy**: Achieve continuous improvement by adding value without adding money, people, large machines, space or inventory towards a goal of no waste. | **Philosophy**: Patient is the centre of their goals. They seek to improve quality to world class levels, becoming the health care employer of choice and reduce costs for their services through cost savings and increased productivity. | **Philosophy**: Their change programme aims to improve the flow of the patients, providing safer care and reducing waiting times for treatment. | **Philosophy**: Vanguard describes their work as being a combination of systems thinking and intervention theory by examining 'how the work works and how to change it.' |
| **Approach:**<br>Long-term thinking which focuses on adding value to the demand of customers. Management decisions are based on a long-term philosophy at the expense of short-term financial goals. 'Quality control is a key part of their activities to produce products economically and to be of a standard that exceeds customer needs.' People are seen as the foundation of the Company where Toyota strives to provide staff with growth and stable employment. | **Approach**:<br>6 areas of focus:<br>1. Patient comes first and is the driver for all processes.<br>2. Create a 'no lay-off policy' and create an environment in which people feel safe and free to engage in improvement.<br>3. Company wide defect alarm system called the – patient safety alert system.<br>4. Encourage innovation and try out new ideas or models of new ideas.<br>5. Eliminate waste<br>6. Accountable leadership. | **Approach:**<br>Uses three tenets for change as a framework:<br>1.Respect for people<br>2.Teaching through experience<br>3. Focus on world-class performance<br>Three goals of TIS is:<br>1. Improve staff morale.<br>2. Improve quality (reduction of defects).<br>3. Improve productivity | **Approach:**<br>'Redesigning Care' focuses on the patient journey from admission to discharge. The programme aims to eliminate duplication and delays and redesign patient flow to ensure every step adds value and improves outcomes for patients and staff. | **Approach:**<br>Aim of the system is to improve service to customers, at lower costs and improve morale. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Goal**: Quality, cost effectiveness, improve delivery, safety and morale. | **Goal**: Quality, safety, customer satisfaction and cost effectiveness. | **Goal**: Quality, cost effectiveness and improve productivity. | **Goal**: Quality, safety and improve productivity. | **Goal**: Quality, cost effectiveness and improve productivity. |
| **Process:**<br>Internally led. | **Process:**<br>Internally led. | **Process:**<br>Internally led. | **Process:**<br>Internally led. | **Process:**<br>Business Consultancy led. |
| **High level diagnostic tool:**<br>Toyota use three types of measures:<br>1. Global performance measures to assess how well the company is doing. Financial, quality and safety measures are used. Financial reports are completed quarterly.<br>2. Operational performance measures to assess how the plant or department is doing. Metrics are used at group and project manager's level which are specific to a process. Progress is assessed using key metrics and compared against 'aggressive' targets.<br>3. Stretch improvement metrics are used to assess how the business unit or work group is doing. Toyota sets stretch goals for the corporation and are made into stretch goals for every | **High level diagnostic tool**:<br>Not mentioned. | **High level diagnostic tool:**<br>Not mentioned | **High level diagnostic tool:**<br>Not mentioned | **High level diagnostic tool:**<br>Entitled 'Vanguard Service Audit.' This is completed by the business lean consultant and takes one week for the results to get back to the organisation seeking their assistance. Recommendations are then made according to their response. |

| | | | | |
|---|---|---|---|---|
| business unit and work group. The measures are very particular to what the teams are trying to achieve. This progress is central to Toyota's learning process. | | | | |
| **1. Toyota** | **2. Virginia Mason Medical Centre** | **3. Theda Care** | **4. Flinders Medical Centre** | **5. Vanguard** |
| **Measures:** Quality control is measured by using very few statistical tools. Quality teams and specialists focus on four tools - 1. Go and see 2. Analyse the situation using process mapping 3. Use one piece flow and andon to surface problems 4. Ask "why" five times. | **Measures**: Measures are analysed during Rapid Process Improvement weeks (RPIW). Process mapping performed to analyse current state, then future state. PDCA then used to perform small tests of change and analysis. Continuous measurement of processes then carried out. These must be simple and not contain too many measures. It supports the strategy to implement lean, motivates the desired behaviour and is not focused on financial measurements; it measures the process rather than the staff and doesn't include ratios which are considered confusing to staff. It must be timely (hourly, daily, weekly) so that corrective action can be carried out identified by trends over time. | **Measures:** Process mapping used to analyse current state and future state to analyse process. Problem solving. | **Measures:** Process mapping used. Measures focus on the process. E.g. Amount of patients seen by doctor, patients waiting for treatment in Emergency dept, etc. Measures are kept simple and relate to the process. Not many used. | **Measures:** Focuses on the process. Variation forms used to analyse current situation. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Tools and Techniques:** Full range of lean tools and techniques used. | **Tools and Techniques:** Lean tools and techniques include: Process mapping, 5S, problem solving, visual management, andon, kanban, cellular design, standardisation, pull system, JIT, single piece flow, gebenchi genbutsi, PDCA / kaizen workshop and policy deployment. | **Tools and Techniques:** Lean tools and techniques include: Process mapping, problem solving, standardisation, pull system, policy deployment and kaizen workshop. | **Tools and Techniques:** Lean tools and techniques include: Process mapping, problem solving, visual management, standardisation, pull system, JIT, single piece flow, continuous improvement / PDCA and policy deployment. | **Tools and Techniques:** Lean tools and techniques include: Process mapping, problem solving, levelling, PDCA / kaizen workshop and policy deployment. |
| Utilises full range of technical manufacturing set of lean tools and techniques. | Utilises five technical manufacturing lean techniques (Pull system, JIT, single piece flow, andon and kanban) | Utilises one technical manufacturing lean technique (Pull system) | Utilises three technical manufacturing lean tools and techniques (Pull system, JIT, single piece flow). | No technical manufacturing lean tools and techniques used. |
| Range spans all four lean bundles - JIT, HRM, TPM, and TQM. | Range spans three lean bundles - JIT, HRM and TQM. | Range spans three lean bundles - JIT, HRM and TQM. | Range spans three lean bundles - JIT, HRM and TQM. | Range spans one lean bundle - HRM. |
| Standardisation: This is seen as being the foundation to continuous improvement and staff empowerment. Stable, repeatable methods are seen as being the foundation for flow and pull. | Standardisation: Used. Examples such as standardised medication checks and patient identity procedures are used. | Standardisation: Used. Examples given such as medication checks and completion of clinical paperwork following patient's hospital admission. | Standardisation: Used. Daily bed management meetings held involving all wards. | Standardisation: Not used. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| Visual Management: Simple visual systems are used at the place where the work is done to support flow and pull. | Visual Management: Safety alerts used to identify issues with medication, equipment and facilities. | Visual Management: Not used. | Visual Management: Used. Examples provided such as bedding location and task boards. | Visual Management: Not used |
| Levelling: Eliminating overburden to staff and equipment as well as unevenness in the production schedule is used rather than adopting a stop / start approach seen in batch production. | Levelling: Not used | Levelling: Not used | Levelling: Not used | Levelling: Although Vanguard state no lean tools and techniques are used, they do recommend departments must address issues of variance within their processes. |
| Continuous improvement - inbuilt process relying on machinery, teams and individuals. Part of culture. | Continuous improvement - weekly team based events lasting one week (RPIW). All staff must attend an 'Introduction to Lean' course and may attend the RPIWs. | Continuous improvement - team based events held during Rapid Improvement Events (RIE). | Continuous improvement - improvement teams used to pass on their learning of lean and work together with other employees on specific projects. | Consultancy aimed to equip staff to continue the process of systems thinking themselves. This was aimed at senior management but was met with little enthusiasm. |
| Policy deployment - strategic alignment, senior management provides involvement, commitment and support. Consultation with all levels of staff. | Policy deployment - strategic alignment, senior management provides involvement and support. | Policy deployment - strategic alignment, senior management involvement and support. | Policy deployment - strategic alignment, senior management provides involvement and support. Some departmental senior managers are in the role of 'lean champions.' | Consultancy recognises need for senior management to align their strategy along-side operational processes. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Organisational structure:** Quite flat. Teamwork is encouraged to make decisions. | **Organisational structure**: Flattened to allow team-based working based on services provided. | **Organisational structure:** Tiered. | **Organisational structure**: Tiered. | **Organisational structure**: Tiered. |
| **Culture**: This is the most important factor of Lean philosophy. Culture is seen to be the most difficult area to develop which Toyota believes takes ten years to develop and sustain a culture working to shared philosophy and goals:<br>• Important to grow leaders who live the philosophy. Senior managers are promoted from within the organisation.<br>• Respect, develop and challenge people and teams.<br>• Respect, challenge and help suppliers.<br>• Toyota provides staff with work satisfaction, job security and fair treatment. | **Culture:** All staff are required to identify waste in their workplace. Change of culture is needed for this which takes time and not easy to achieve. Leaders must create a clear vision statement that guides staff to make the right choices. No lay-off policy adopted. | **Culture:** Staff are seen as the organisation's biggest attribute. Accomplished lean thinkers are moved to work in other departments to spread change throughout the organisation. They believe a new culture requires new behaviours including the use of small right sized groups of workers or technologies working in cells rather than large, cumbersome processes. They see a new culture of lean means some roles change where managers become teachers, mentors and facilitators. | **Culture:** Staff from all levels are involved in the model. This helps everyone see where the work goes from end to end and identify were the waste lies. Organisation is keen to avoid a blame culture, do not threaten job insecurity and ensure staff are listened to. These elements are interpreted by Flinders as 'Respect for People.' | **Culture:** Vanguard state 'the people on the spot have the responsibility and capability to do what is needed (empowerment).' The organisation should make intelligent use of its intelligent staff and the proper design of jobs ensures that staff have the responsibility to act. This enables staff to take ownership and pride in their work. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| Utilises all levels of staff. The whole team is involved in redesigning any improvements to the process. | Utilises all levels of staff. The whole team is involved in redesigning any improvements to the process. | Utilises all levels of staff. The whole team is involved in redesigning any improvements to the process. | Utilises all levels of staff. The whole team is involved in redesigning any improvements to the process. | Utilises staff at operational level. Seeks senior management support. The lean consultant is a strong influence in redesigning any improvements to the process. |
| Internal lean leader used as part of CI process – role is carried out as part of daily routine and integrated within supervisory capacity. | Internal lean leader appointed specific to process, not necessarily in a supervisory role. | Role of management are seen as 'teachers, mentors and facilitators rather than directors or controllers.' | Internal lean leaders are termed as 'lean champions.' They are senior staff in a role specific to their work streams, such as medical, mental health, surgery, emergency and pharmacy. | No internal lean leader - external consultancy led. |
| Senior management support. Promotes from within the organisation. | Senior management support Involves top-line leadership and strong commitment from senior managers. Chief Executive (CEO) needs to be vocal and a visible champion of lean management. | Senior management support | Senior management support | Senior management support. Tended only to be interested in the results of the projects however. |
| Utilises work-based teams - cross functional. | Utilises work-based teams - cross functional specific to service area | Utilises work-based teams - cross functional specific to service area | Utilises work-based teams - cross functional specific to service area | Utilises work-based teams. Departmental focused |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Training:** Everyone in the organisation is involved in training. It is seen as part of the TPS culture. Continual learning is done through kaizen. Training is carried out routinely as part of daily routine tasks. Kaizen events lasting one week are used by cross-functional teams where senior managers or staff who have authority to implement change attends. | **Training:** All staff are involved in training. Training began with senior management who went to learn about lean from Toyota. All staff are required to attend an 'Introduction to Lean' course. Kaizen events are held which last four or five days focusing on analysing current processes and implementing changes. | **Training:** Understanding of lean began with **s**enior managers who visited a local manufacturer who utilised the Lean philosophy. All staff are required to attend a week-long training event called 'Event weeks.' Participation is mandatory for all staff to attend at least one event. | **Training:** All staff receive lean training. Rapid improvement events lasting one week are used involving a cross section of staff from various functions. | **Training:** Teams of four or five members were selected for the pilot studies with a minority of 'first-level managers.' The teams were introduced to the 'Systems Thinking' philosophy over two days and learned skills to carry out the 'check' stage of the methodology. The teams were supported by an organisational sponsor who had sufficient seniority to clear any obstacles that may be in the way of progress. The sponsor had to attend a three day awareness event prior to the start of the project. Training sessions were offered to senior managers to equip them into continuing with the model and aligning their roles, measures and structures. These sessions were difficult to arrange however, and senior managers only became directly involved when asked. |

| 1. Toyota | 2. Virginia Mason Medical Centre | 3. Theda Care | 4. Flinders Medical Centre | 5. Vanguard |
|---|---|---|---|---|
| **Sustainability**: Sustainable organisation - maintained the philosophy since post war. Toyota state it takes at least ten years to become a lean learning organisation. Model is used throughout entire organisation, globally. | **Sustainability:** Aiming towards sustainability - maintained lean since 2002. Lean is being adopted throughout the organisation. Model is partially used. Plan to extend lean into other departments. | **Sustainability**: Aiming towards sustainability - maintained lean since 2004. Lean is being adopted throughout the organisation. Model is partially used. Plan to extend lean into other departments | **Sustainability:** Aiming towards sustainability - maintained lean since 2003. Lean is being adopted throughout the organisation. Model is partially used. Plan to extend lean into other departments. | **Sustainability**: Impossible to predict sustainability. The interventions were used as pilot studies. No information has been released to indicate whether the programme has been adopted by the pilot organisations or in other Local Authorities. No mention if project will be extended to other LG organisations. |

**Table 2.2 Existing Lean-based Models**
*Source: Author*

This section reveals a lack of lean models exists in the PS which is reflected by the academic literature although most work appears to be carried out in health care compared to LG. Toyota's lean model was used as a benchmark to assess how the PS case study examples have so far interpreted lean and adapted the model for use in their organisations. This information will be taken forward towards recommending a lean framework for use in LG.

The PS case study examples made use of:

- A lean model name to reflect the purpose of their service provision.
- The health care model designs shared similarities with that of Toyota that were based on philosophy, process, people and partners and problem solving (4P). The model design used by Vanguard however differed and focused on problems identified within a system's process. This difference may be better explained as the lean models described in the health care case study examples were designed by each organisation for their specific use where Vanguard is a business consultancy whose generic lean model is used in any service organisation seeking their guidance.
- The approach and goals were shared by each case study example where their focus was to eliminate waste from customers needs.
- No empirical evidence was obtained from the PS case studies to suggest the use of a high level diagnostic tool although Vanguard claimed to incorporate one within their model despite its content being unknown. It is assumed their diagnostic tool is generic as they provide guidance for service providers outside the PS and for this reason its applicability is questionable.
- Process mapping was the only system used by all PS case studies to identify existing problems.
- The range of lean tools and techniques provided by the PS case studies was small in comparison to those used by Toyota although each was selected according to their need.
- Policy deployment was used by all of the PS case studies as part of their organisational culture to help them achieve strategic alignment and

effectively communicate the organisation's objectives. This would help the PS organisations become sustainable although the academic literature reports this is a slow process to achieve and it is therefore too soon to report or predict lean's long-term success in the PS.

- All of the health care case studies used internal lean leaders and training as part of their process to achieve sustainability.

### 2.3.4 Lean Tools and Techniques within the PS

Tables 2.3 and 2.4 illustrate the type of lean tools and techniques used by health care and LG organisations already described in the PS case study analysis. These are in contrast to the types of tools and techniques used by automotive and manufacturing organisations illustrated in Table 2.1:

- The most commonly used lean tools and techniques in the Manufacturing sector are kanban, process mapping, cellular / design flow, changeover reduction, JIT and 5S.
- Table 2.3 representing health care reveals the most commonly use lean tools and techniques are process mapping, problem solving, standardisation, pull, continuous improvement / PDCA / kaizen workshop and 5S.
- Table 2.4 representing LG reveals process mapping, problem solving, continuous improvement / PDCA / kaizen workshop and standardisation are favoured most.

Conclusions from Tables 2.3 and 2.4 reveal there are similarities between health care and LG in the choice of lean tools and techniques used. Overall, the lean tools and techniques used across these areas of the PS appear to be (1) process mapping, (2) problem solving, (3) continuous improvement / kaizen workshop / PDCA and (4) standardisation. This suggests lean tools and techniques may be appropriate for any organisation providing they are selected to match the right problem identified during the process mapping stage. A caveat exists however as it is questionable whether the full range of lean tools and techniques are applicable for use in the PS as their intended use and design are for manufacturing

organisations. Limited academic knowledge exists into how PS organisations have effectively used lean tools and techniques and there is a lack of evidence to suggest PS organisations have devised lean tools and techniques contextualised for their needs.

A description of the most commonly combined used tools and techniques within health care and LG, as supplied in the case study examples of Tables 2.3 .and 2.4, can be made according to Bicheno (2004) and Emiliani (1998). Process mapping is missing from the list as its description has already made within the manufacturing section of this chapter.

1. Problem Solving is the most commonly used technique within continuous improvement activities. Issues may be resolved by reflecting upon past experiences or solved using techniques to seek out the root cause. One such technique is ‘5 Whys’ which requires the user to ask “why?” several times over to establish the root cause of a problem.

2. Continuous Improvement is also referred as the Japanese term ‘kaizen’ and it is dedicated towards striving for quality as seen by the customer. It achieves this by making small incremental improvements involving all levels of staff forever.

3. Kaizen Workshop is a group activity, usually occurring over five days, where problems are identified amongst the group and improvements are implemented within the process.

4. PDCA is an improvement cycle also referred as the ‘Deming Cycle’ named after W. Edwards Deming who introduced the concept in the 1950’s. It is a four stage method used to propose change within a process, implement change, measure results and take relevant action. The stages are known as (1) Plan, (2) Do, (3) Check, (4) Act.

5. Standardisation is way of making improvements in the workplace by establishing a set of defined procedures. It covers three aspects:

- Work time - the rate at which products or procedures are made within a process to meet customer demand.
- Work sequence - the order in which a worker performs certain tasks within a period of time.
- Standard inventory - this is required to keep the process operating smoothly.

Another purpose for providing evidence from the case studies used in Tables 2.3 and 2.4 is to demonstrate that PS organisations only use a small proportion of lean tools and techniques compared with manufacturing industries. This may be due to lean being more established over a longer period of time in manufacturing compared to PS. An alternative factor may be due to the PS adopting the support from external business consultants who are more familiar with manufacturing processes rather than services.

Research conducted by Radnor et al (2006) into identifying the use of lean in the Scottish PS found process mapping was the only lean technique commonly used amongst these organisations. The PS organisations under scrutiny were varied and consisted of two NHS hospitals, a Local Authority department, a Government agency and the Royal Air Force. Bhasin et al (2006) suggests having knowledge of lean tools and techniques isn't enough but in order for companies to convert to a lean organisation they must nurture a culture through a combination of long-term philosophy, processes and problem-solving. Finally, Yasin et al (2001) state training management and employees is essential to create an organisational culture that is consistent with lean. However, Yasin et al (2001) warns human related problems such as resistance to change and a lack of support may contribute to lean's failure. A root cause of these problems may be a lack of communication between management and employees.

Conclusions from Tables 2.1, 2.3 and 2.4 reveal that lean tools and techniques can be transferred to the PS although further investigation is required regarding the relevance and choice of each of the techniques used. Limited academic knowledge exists into how PS organisations have effectively used lean tools and techniques and there is a lack of evidence to suggest PS organisations have devised lean tools and techniques specific for their needs. The amount of lean tools and techniques used in the PS are fewer than those used in manufacturing and could be explained due to the choice of change agent or the PS having insufficient knowledge and experience of lean. Cultural issues such as lack of commitment from staff, insufficient support from senior management and resistance to change are all factors which need further investigation and may prohibit lean's sustainability in the PS. It is questionable whether the full range of lean tools and techniques are applicable for use in the PS which may affect sustainability issues as their intended use and design are for manufacturing organisations.

| | Name of Organisation | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reference No:** | 1. | 2. | 2. | 3. | 4. | 4. | 5. | 6. | 6. | 7. | 8. | 9. |
| **Tools / Techniques** | Shouldice | Hereford | Bolton | Flinders | V.M | Theda Care | Nord 92 | CS. 1 | CS 7 | Mater | Calderdale | St Helens |
| Process Mapping | | X | X | X | X | X | | X | X | X | X | X |
| 5S (workplace management) | | X | | | X | | X | | | X | X | X |
| Problem Solving | | X | X | X | X | X | X | | | X | X | X |
| Visual Management | | | | X | X | | X | | | X | | |
| Poka Yoke | | | | | | | | | | | | |
| Kanban | | | | | X | | | | | X | X | |
| Andon | | | | | X | | | | | | | |
| Takt Time | | | | | | | | | | | | |
| Jidoka | | | | | | | X | | | | | |
| Levelling | | | | | | | | | | | | X |
| Changeover Reduction | | | | | | | | | | | | |
| Standardisation | X | X | | X | X | X | X | | | X | X | X |
| Standard Set-up | | | | | | | | | | | | |
| SMED | | | | | | | | | | | | |
| Cellular Design/Flow | X | X | X | | X | | | | | | | |
| SPC | | | | | | | | | | | | |
| Design for Manufacture | | | | | | | | | | | | |
| Quality Teams | | | | | | | | | | | | |
| Gebenchi Genbutsi | | | | | X | | X | | | | | |
| TPM | | | | | | | | | | | | |
| Pull System | X | X | | X | X | X | | | | X | X | |
| Milk-run | | | | | | | | | | | | |
| Just-in-Time | | | | X | X | | X | | | | | |
| Single Piece Flow | | | X | X | X | | | | | | X | X |
| Continuous Improvement / PDCA / Kaizen Workshop | | | | X | X | X | X | X | | X | X | X |
| Policy Deployment | | | | X | X | X | | | | | | |

**Table 2.3 Lean Tools and Techniques used in the PS (Health care)**

*Source: Author*

| | Name of Organisation | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reference No:** | 1. | 2. | 3. | 3. | 3. | 4. | 5. | 6. | 7. | 7. | 7. | 7. |
| **Tools / Techniques** | Immigration | HMRC | Preston Rent Collection | Leeds Housing department | Tees Valley Repairs | Aberdeenshire Planning department | Aberdeenshire Finance department | Probation Service | CS 2 | CS 5 | CS 6 | CS 8 RAF |
| Process Mapping | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | | | | **X** |
| 5S (workplace management) | | **X** | | | | | | | | | | |
| Problem Solving | **X** | **X** | **X** | **X** | **X** | **X** | **X** | | | | | |
| Visual Management | | **X** | | | | | | **X** | | | | |
| Poka Yoke | | **X** | | | | | | | | | | |
| Kanban | | **X** | | | | | | | | | | |
| Andon | | **X** | | | | | | | | | | |
| Takt time | | | | | | | | | | | | |
| Jidoka | | | | | | | | | | | | |
| Levelling | | | **X** | **X** | **X** | | | | | | | |
| Changeover Reduction | | | | | | | | | | | | |
| Standardisation | **X** | **X** | | | | **X** | | **X** | | | | |
| Standard set-up | | | | | | | | | | | | |
| SMED | | | | | | | | | | | | |
| Cellular design/flow | | **X** | | | | | | | | | | |
| SPC | | | | | | | | | | | | |
| Design for manufacture | | | | | | | | | | | | |
| Quality teams | | | | | | | | | | | | |
| Gebenchi Genbutsi | | **X** | | | | | | | | | | |
| TPM | | | | | | | | | | | | |
| Pull System | **X** | **X** | | | | | | | | | | |
| Milk-run | | | | | | | | **X** | | | | |
| Just-in-Time | | | | | | | | | | | | |
| Single Piece Flow | **X** | **X** | | | | | | | | | | |
| Continuous improvement / PDCA / Kaizen Workshop | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Policy Deployment | | | **X** | **X** | **X** | | | | | | | |

**Table 2.4 Lean Tools and Techniques used in the PS (LG)**
*Source: Author*

2.3.5 Effects of Lean in the PS

The purpose of this section is to examine the effects of lean used by PS case studies. These examples derive from academic literature and describe the approach, benefits to the organisation and barriers for lean implementation that were encountered along the way.

**Virginia Mason Medical Centre**

Nelson-Peterson et al (2007) conducted their case study research by examining lean tools and techniques carried out at the Virginia Mason Medical Centre (VMMC) in the USA. VMMC is a 336 bed hospital and integrated hospital system with 5,000 employees. In 2001 the hospital systems were faced with waste and rework which prompted senior management to seek improvements into their financial performance. After the senior managers consulted with the Toyota automotive production plant in Seattle to learn about lean they created their own system based upon these findings. This became known as the Virginia Mason Production System (VMPS).

Approach:

The hospital focused on the 5 lean principles identified by Womack et al (1996). This was achieved by eliminating processes of waste and inefficiencies within its system by reducing costs. An improved product with an emphasis on safety and quality was therefore achieved. A major component of the VMPS is process mapping and nearly every area in the medical centre has a high level value stream map and a detailed process flow diagram. These show how the departments are making productivity improvements based upon their findings held during the Rapid Process Improvement Workshops (RPIW). The RPIW is a week-long workshop that brings together a team of six to eight members of staff including team leaders and front-line staff, for intensive study and work is focused on improving processes found to be defective or broken. The theory behind an RPIW is to look at a process, measure it, identify any wastes within the process, decide what is value-added or non-value added for the customer and improve the process by creating standard work using a set of standardised metrics to point the work in the right direction. Outcomes identified during the RPIW are re-measured at intervals of 30,

60 and 90 day intervals to determine how much impact the lean implementation has made.

Lean tools and techniques were used based upon the findings of the metrics and included U-shaped cells, single piece flow, standard work, JIT, kanban, cycle time and andon (Table 2.3). U-shaped cells were used to re-arrange patient assignments from long rows into U-shaped areas in order to reduce the nurses walking distance. Single piece flow was used to put the nurses' morning rounds into sequence so they could complete all aspects of work with one patient before moving onto the next patient. Standard work was used to ensure all staff conformed to the same work process such as handover reports being carried out in the same way. JIT was used to ensure supply boxes were re-stocked as needed using the kanban system. The kanban was a visual flag system used together with JIT indicating the need for re-stocking supplies. Cycle time was used to measure the length of time taken to carry out an assessment and documentation for one patient. Finally, andon involved placing coloured flags on the patients' room door to indicate the status of the room and to highlight any key indicators for the patient. All staff were involved in this visual process and they adjusted the flags according to the changing status.

Benefits:

There were positive outcomes from the improvements including staff spending more time at the bedside; the significance of this saw a reduction in patient falls, with there being only one fall since November 2005. There was an 85% reduction in the amount of distance nurses walked during their shift; nursing hours per patient per day which had previously been over budget at an average of 9.0 fell below budget to 8.36 with a 2% reduction in over-time.

Barriers:

Nelson-Peterson et al (2007) identifies key barriers in the case study which are also found in the Manufacturing sector. These include staff initially complaining of changes within their working practice and a reluctance to embrace new ideas. This was over-come by senior management visiting each work area on a daily basis to obtain feedback of any problems or concerns from staff.

**Laboratory use of Papanicolaou testing**

A case study conducted by Raab et al (2006) was carried out to examine whether lean can improve Papanicolaou test quality and patient safety. The need for the study was to improve quality and reduce inefficiencies.

Approach:

Before the project began, hospital laboratory staff met with an external lean consultancy agent to determine how lean tools and techniques could be implemented. This was an eight month study that included 464 case and 639 control women who had a Papanicolaou test performed. The lean tool and technique reported to have been used was 'one-piece continuous flow.'

Benefits:

The study revealed benefits were achieved which included improvements in the amount of test accuracy and less time to carry out the tests.

Barriers:

Barriers to implementation were identified and included staff resistance to change. These were caused by the extra time it took to complete the medical checklist and the lack of an on-site lean leader who had experience in lean procedures. Each barrier was addressed by changing the processes such as shortening the checklist, faxing Papanicolaou test results to the doctor and seeking further advice from a lean consultant at selected intervals.

**NHS Trust Hospital**

Massey et al (2006) conducted research to discover whether one lean technique used in manufacturing could be transferred to the Health sector. Their case study focuses on an un-named NHS Trust within the UK and as a result they admit their findings are therefore limited. The length of time spent on the case-study is unspecified although they report their findings are taken from the early stages of a long-term investigation.

Approach:

The study involved the use of internal change-agents within the hospital Trust who obtained their knowledge of lean tools and techniques from an external lean consultancy. The one lean tool and technique used was workplace management, also known as 5S or CANDO, where the purpose of this is to bring about a positive change that has an immediate impact on the work environment. Workplace management can improve many aspects within the organisation including quality control, supplies and inventory and maintenance (Massey et al, 2006 and Rich et al, 2006). The aim is to put the principles of workplace management into practice by staff making an evaluation of their workplace and then to develop a controlled and disciplined environment so that staff can carry out their job easily and in a safe manner.

Benefits:

The benefits brought about from the case study reveal the majority of respondents referred to an improved working environment which was less stressful and it allowed them to more easily find equipment and paperwork (Massey et al, 2006). The awareness of the department's processes and procedures and the flow of work had also improved. The long-term benefits focused on more strategic areas of customer service, health and safety and policies where a majority of the respondents noticed the environmental and organisational improvements that the workplace management practice had produced.

Barriers:

Massey et al (2006) report of barriers to the project as staff resistance to change was found. This presented in terms of approximately a quarter of the team having difficulty in removing or discarding unnecessary items from their working environment. There was also apprehension and cynicism from some members of staff who later stated there was a need for better communication about the project before it began. Massey et al (2006) describe all the change agents who participated in the study were aware of the origins of workplace management and some of the reluctance from staff appeared to be associated with its automotive background. Therefore, the terminology associated with the training needed to be contextualised within the PS.

**Vanguard Consultancy**

Although there appears to be a lack of empirical research into lean implementation in LG, work has been carried out by business consultancies claiming to have lean expertise. One of these business consultancies is Vanguard Consultancy who, in 2004, were assigned to carry out a pilot programme on behalf of the Office of the Deputy Prime Minister (ODPM, 2005). This was in response to the Gershon Report (2004) which announced there was to be a review of efficiency in the PS. The ODPM therefore wanted to discover whether applying lean could lead to a better and more efficient service. Vanguard worked with three housing organisations in areas such as rent collection and debt recovery, voids and re-housing and responsive repairs. These areas of work were chosen by the ODPM because they are considered to have the most impact on resources and the customer as well as offering the greatest opportunity for efficiency gains.

<u>Approach:</u>

Vanguard is reported to have used their lean model in the project called the 'Systems Approach' where it was created by them using principles adapted from Toyota and Deming. There are five principles used in their approach that include:

1. Understand that work must be understood from the outside in - this means the organisation's system must be based on customer demand.

2. The system is designed against predictable demand - the demands of the service need to be assessed to understand what the customer wants from the system.

3. Understanding the flow of the work through the whole system is critical.

4. Pull - This means work is completed when it is needed and the right resources are used at the right time.

5. The people on the spot have the responsibility and capability to do what is needed.

The lean tools and techniques used in their approach included process mapping, problem solving, levelling, continuous improvement / PDCA / kaizen workshop and policy deployment.

Benefits:

The results of the pilots were positive and included:

- Repairs - End to end time was reduced on average from 46 days to 5.9 days. Customer satisfaction following a repair revealed that 61% of tenants scored the service 10/10 with a total of 90% scoring 8/10 or above. Potential six figure efficiency gains.
- Rent collection - First payment on accounts for new tenants was reduced from an average of 34 days to 20 days. There was a reduction in the amount of new tenants falling into arrears from 43% to 18%.
- Re-housing - There was a reduction in the amount of steps taken in the re-housing process from 64 to 32. A void re-let time of 50 days was reduced to an average of 25 days.

Barriers:

According to the report by the ODPM (2005) there were barriers to lean implementation experienced by the three housing groups. This included staff finding difficulty in balancing their workload and attending the training sessions. There was also negativity and suspicion displayed by members of staff not working on the project. Although Vanguard worked with three different housing groups across the UK, their approach was the same.

**PS Case Study Analyses**

Examples of how lean has been implemented across the PS are provided in Table 2.5. Empirical evidence is used to illustrate how PS organisations adopted their lean approach, reasons for change, how benefits were achieved and known barriers to implementation.

Approach:

The PS case study examples fail to reveal which lean model was used by them to bring about improvements in productivity performance although external business consultants are widely used as change agents. There is only one Local Authority (Aberdeenshire Council) who admits their staff are trained to become internal lean leaders in an attempt to become self-sufficient.

Reasons for change:

Table 2.5 shows most of the PS organisations within the UK acknowledge their need to become lean is to comply with meeting national targets. Although the case studies do not specify their main policy driver, it is likely to be the Gershon Report (2004) which has prompted quality initiatives across the PS. The Institute for Innovation and Improvement in the NHS has, for example, developed the 'No Delays' programme (www.institute.nhs.uk). They describe how Hereford Hospitals NHS Trust has made improvements in their Pathology laboratory following the 'No Delays' programme. Efficiency improvements were made in the department using a Clinical Process Consultant and involved over 40 pathology staff.

Benefits:

Table 2.5 provides a wider description of lean benefits in health care have been achieved compared to LG although there is some proof to suggest improvements have been made there as well. Evidence from two case studies presented in Scotland by the Improvement Service provides better comparative descriptions of lean implementation than other Consultancy reports used in Table 2.5 The most significant improvement is that obtained by Aberdeenshire Council's Planning Applications department who began their lean project to meet Government targets. The Planning department reported the amount of planning applications was rising before the project began where the average time to process applications ranged from four to seven days with 2% of them being completed in three days or less. The amount of steps in the process varied from four to nine and the 'hands-on' time to process applications varied from 1.2 to 2.6 hours. Although the Improvement Service (www.improvementservice.org.uk) does not state which lean model Aberdeenshire Council used, they mention which lean tools and techniques

were used (Table 2.5). This included process mapping, problem solving, standardisation, continuous improvement and kaizen workshop.

Barriers:

There is little empirical evidence from Table 2.5 to report of barriers to lean implementation in the PS. Limited evidence revealed there was difficulty for staff to balance their workload and attend lean training. Initial negativity and suspicion were reported by staff before lean implementation and there was a lack of commitment from all levels of staff with criticism regarding the lack of support from senior managers.

Conclusions can be drawn from the PS case studies in this section which reveal most of the empirical research derives from health care providers rather than LG; suggesting further empirical investigation is required in this area. Further investigation is also necessary following the evidence supplied from the case studies. PS organisations are more likely in their lean approach to use business consultants as change agents rather than training their own staff to become internal lean leaders and be self-sufficient. Table 2.5 shows most of the PS organisations within the UK acknowledge their need to become lean is to comply with meeting national targets and although the case studies do not specify their main policy driver, it is likely to be the Gershon Report (2004) which has prompted quality initiatives across the PS.

Although the case studies do not reveal which lean model was used to bring about improvements in productivity performance there appears to be significant improvements from the limited evidence supplied by them. Where information was described on barriers to lean implementation this revealed initial negativity, suspicion and lack of commitment from all levels of staff with criticism in the lack of support from senior staff. What is also not known at this early stage is the sustainability of any improvements made so far in the PS.

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **1.** Health care provider. Shouldice Hospital, Canada. | None Known | None Known | None Known | Low cost and good recovery rates.<br>Operating rooms arranged in U shape configuration to allow for sharing of information, expertise and using only one anaesthetist.<br>Focuses on one procedure leading to standardised work.<br>Patient involvement begins at screening process and therefore allows effective flow through system, seen as value added. |
| **2.** Health care provider. Hereford Hospitals NHS Trust (Pathology lab) | Clinical Process Consultant.<br><br>Involved over 40 staff across pathology department. | Test results were delayed impacting on patient discharge.<br>Staff resources were used inefficiently to work around significant increase in demand arriving late afternoon at 15.30 hours.<br>Four GP deliveries all arrived at similar times resulting in 60% of the daily workload. | None Known | Turnaround time reduced by 40%, saving £365k/year.<br>Time for specimens to be collected reduced by 93%, saving £10k/year.<br>Double handling of labelling eliminated, saving £3k/year.<br>Time all work complete - staff finish 15 minutes early, meaning more time to improve quality.<br>Centrifuge productivity (per hour - peak demand) improved by 252%, saving £5k/year. |
| **3.** Health care provider. Bolton Hospital (Pathology lab) | Consulted with the Lean Enterprise Academy and changes were led internally by involving a team of staff within the department. | Blood sample journey took 309 steps.<br>Urgent samples took 75 steps.<br>Endocrinology samples processed between 24 and 30 hours. | None Known | Blood sample journey reduced to 57 steps.<br>Urgent samples reduced to 57 steps.<br>Endocrinology samples now take between 2 and 3 hours.<br>70% reduction to complete most tasks.<br>40% reduction in floor space required. |
| **3.** Health care provider. Flinders Hospital Australia (Casualty Dept) | Consulted with the Lean Enterprise Academy and changes were led internally by involving a team of staff within the department. | In 2003 more than 1000 patients waited in excess of 8 hours for treatment with up to 80 patients waiting in the department at the same time. | None Known | After reviewing and changing the old system the waiting times reduced by 25% with 70% patients going home within 4 hours. |

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **4.** Health care provider. Virginia Mason Hospital, USA. | Obtained knowledge through visits to Japanese production sites, namely Toyota and Hitachi.<br>Changes were internally led and the hospital developed its own strategic vision based upon the Toyota Production System, known as Virginia Mason Production System (VMPS) | In 2000 the organisation experienced economic stress and a 'general malaise' in the organisational structure.<br>A need for a sharper business focus and accountability was required. | None known although the literature states that the leaders feel the work of implementing lean throughout the organisation remains challenging, requiring considerable focus and commitment. | Results are shown after 2 years of lean in 2004 with a change from 2002.<br>Inventory - Reduced by 53%.<br>Productivity - 36% redeployed to other positions.<br>Floor space - Reduced by 41%.<br>Lead time - Reduced by 65%.<br>People distance travelled - Reduced by 44%.<br>Product distance travelled - Reduced by 72%.<br>Setup time - Reduced by 82%. |
| **4.** Health care provider. Theda Care, USA | Obtained knowledge through consulting with a local manufacturing company who had adopted lean for several years.<br>Changes were internally led. | To recognise the need to improve staff morale, improve quality by reducing defects, improve productivity. | None Known | $3.3 million savings in 2004.<br>$154,000 savings in Catheterisation Lab supply procurement process.<br>In 2004, reduced accounts receivable from 56 days to 44 days equating to approx $12 million in cash flow.<br>Redeployed staff in several areas saving the equivalent of 33 FTEs. |
| **5.** Health care provider. Nord 92 Hospital, France. | Consulted with the Projet Lean Enterprise, which is an academic lean initiative in Paris. | Nursing staff identified many common problems that they had tried to tackle but previously failed. A decision was made to try 'Lean' as a new approach. | Hindrances to the hospital adopting the Lean approach were other improvement drives such as a nationwide quality accreditation audit and a change to the computer system. | In over the first 2 years of adopting lean approach the rate of incidents per patient halved.<br>Results are purposely very gradual due to the approach and the desire to change organisational culture.<br>Using Problem Solving to track spread of MRSA routes and fall incidents. |

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **6.** Health care provider. (CS 1) | Business consultancy. | Looked at 'Flow time' by measuring the time taken for patients to be processed from being admitted via Casualty, departure to ward or theatre with necessary diagnosis and treatment. 'Manual time' was measured by observing time in which an activity was being carried out by staff on the patient. 'Number of steps' measured as carried out by staff from admitting to discharging a patient. | None Known. | Efficiency improvements led to a significant decrease in staff turnover which was previously 25 - 30% and is now around 4%. Reduced the 'acknowledgement time' to 3 days with a lot of applications being acknowledged on the date of receipt. Process time had been reduced to between 14 and 21days. |
| **6.** Government Agency. (CS 2) | Business consultancy | Unable to cope with additional workload within existing resource constraints. | Lack of resources and commitment to change amongst all staff. Slow pace of change. Poor support from senior management. | Now able to achieve additional workload. Department achieved their on-going target of never failing to complete their part of the process within the seven day limit. Subjectively, better quality reports and improved communication. Variation in workload now spread more evenly across team members. |
| **6.** Local Authority. (CS 5) | Business consultancy | Reacted to change due to comply with national targets, therefore requiring the need to improve service performance. | Poor commitment to change amongst all staff. Slow pace of change. Lack of ownership for the improvement activity. | £1 million savings in current financial year with a further target of £695,000 being set for following year. |
| **6.** Government Agency (CS 6) | Business consultancy | Reacted to change due to comply with national targets, therefore requiring the need to improve service performance. | Lack of resources and commitment to change amongst all staff. Slow pace of change. Poor support from senior management. | Efficiency improvements led to a significant decrease in staff turnover which was previously 25%-30% and is now around 4%. Reduced the 'acknowledgement time' to 3 days with a lot of applications being acknowledged on the date of receipt. Process time reduced to between 14 and 21 days. |

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **6.** Health Agency (CS 7) | Business consultancy | There was a need to improve the patient experience through implementation of the 'Top 20 Actions for Change' Government initiative programme. Need to achieve the target of a maximum of 62 days for all urgent primary care referrals to the commencement of first treatment. | None Known | One centre reported they had increased their percentage of patients meeting their fixed target from approx 40% in 2003 to currently 75-80% as an overall 62 day target. A contributing factor in the process was the journey of a cancer patient taking 6 steps less than before allowing for an average reduction in time for first appointment from 23 to 12 days. |
| **6.** RAF (CS 8) | Business consultancy | Reacted to change due to comply with national targets, therefore requiring the need to improve service performance. | Lack of management and staff commitment throughout the change process. Sustainability problems due to staff changing posts. | Reduction of 105 people in manpower. Budget saving of £31 million. Total savings for the platform programme to date being over £60 million. |
| **7.** Health care provider. Mater Hospital, Ireland. | Facilitated by the NHS Pathology Improvement Team. | A number of causes of poor quality were identified, many of which stemmed from the arrival specimens in large batches. Evidence of excessive inventory and poor layout contributing to wasted staff time and excessive transport and motion. | None Known | Gains made in five days included:<br>Flow to department every ten minutes.<br>Batch size reduced.<br>Flow of small batches to analyser highlighted 50% over capacity in analysers.<br>Skill mix changes made in loading analysers.<br>Handoffs reduced from seven to six.<br>Highlighted areas of over staffing, surplus inventory, excess equipment capacity and poor skill mix.<br>End to end patient turnaround reduced by 57%. |
| **8.** Health care provider. Calderdale Histology | Supported by the NHS Pathology Improvement Team. Members of the Health Trust executive | Batched transportation of samples in long waiting times for these to be processed. Inconsistency of sample labelling. Poor laboratory layout and location of specimen reception. | None Known | Specimen reception was relocated in walking distance which was reduced from 60 steps pre-lean. Reduced batch size by maximum of 20 samples. Overall reduction of non value |

| | | | | |
|---|---|---|---|---|
| Laboratory | and pathology management teams took part in the training as well as shop floor staff. | | | added time of 89% in specimen reception. Specimen processing time reduced by 32%. |
| **Reference No / Service Description** | **Change Agent** | **Reasons for change** | **Barriers** | **Benefits** |
| **9.** Health care provider. St. Helen's Trust, Chemistry Laboratory. | Facilitated by the NHS Pathology Improvement Team. | Hospital reacted to the need to comply with national targets. The local target being for any clinical chemistry specimens to be processed in less than one hour of them arriving in the pathology department.<br>Pressure was to improve performance. Evidence of batching, poor flow due to poor siting of technology and layout which were contributing to poor turnaround times. Poor usage of automated transport systems to the laboratory. | None Known | Inpatient samples: Laboratory turnaround time in one hour reduced from 50% to 78%. End to end turnaround time as a percentage in less than 90 minutes reduced from 15% to 42%.<br>Casualty samples: Laboratory turnaround as a percentage in less than one hour reduced from 68% to 89%. End to end turnaround time as a percentage in less than 60 minutes reduced from 30% to 56%. |
| **10.** Home Office Immigration Department | Business consultancy 'Ad-Esse Consulting Ltd' | Reacted to change due to the need to comply with European Union for law where applications from EU nationals need to be processed within 20 days and non EU national to be processed within six months. | None Known | Cases are checked whilst in the queue resulting in customers being alerted quickly if further documentation is required.<br>Stopped unnecessary photocopying saving 5 minutes per case which in a year equates to 338,400 minutes or 13,538 extra grants being processed per year. |
| **11.** Government Department Tax Office | None Known | None Known | None Known | Began in 2005 by focusing on 'Self Assessment' as being one of the first processes for change. The initial impact for ten of the largest sites saw a quality improvement of 44% with a minimum of 30% productivity improvement.<br>It has since spread across 31 processing sites and involves approximately 14,000 staff. |

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **12.** Local Authority. Preston City Council (Rent collection) | Business consultancy 'Vanguard Consulting' | Reacted to change due to comply with national targets Need to Pilot study commissioned by Northern Housing Consortium in conjunction with Vanguard Consulting. | Some staff found difficulty in balancing their normal work and attending the course. This meant staff had to work overtime to maintain their workload. Progress was hampered by those staff not involved in the project. | For new tenants, first payment on the new account was reduced from an average of 34 days to 20 days.<br>Only 18% new tenants fell into arrears compared to 43% previously. |
| **12.** Local Authority. Leeds Southeast Homes. (Voids and re-housing). | Business consultancy 'Vanguard Consulting' | Reacted to change due to comply with national targets Pilot study commissioned by Northern Housing Consortium in conjunction with Vanguard Consulting. | Some negativity and suspicion was displayed from some members of staff not working on the project. | 64 steps in process reduced to 32 steps.<br>Reduced void re-let time of 50 days to an average of 25 days.<br>Potential reduced void loss as a consequence estimated in excess of £90,000. |
| **12.** Local Authority. Tees Valley Housing Group. (Responsive repairs). | Business consultancy 'Vanguard Consulting' | Reacted to change due to comply with national targets Pilot study commissioned by Northern Housing Consortium in conjunction with Vanguard Consulting | Some staff found difficulty in balancing their normal work and attending the course. | End to end time reduced on average from 46 days to 5.9 days.<br>Customer satisfaction following a repair shows that 61% of tenants score the service 10/10 with a total of 90% scoring 8/10 or above. This compared to latest 'STATUS' survey of 77% tenants who rated the service as average.<br>Potential six figure gains forecasted. |

| Reference No / Service Description | Change Agent | Reasons for change | Barriers | Benefits |
|---|---|---|---|---|
| **13.** Local Authority. Aberdeenshire Planning Applications | Business consultancy. Ross International, who then trained council staff to be facilitators in Lean, therefore making them self-sufficient | Six area offices dealt with the registration and planning applications across Aberdeenshire. Amount of applications was rising and the Council needed to meet the increased demand. Average time ranged from 4 to 7 days with 2% of applications being completed in 3 days or less. Number of steps in the process varied from 4 to 9 and 'hands-on' time to process applications varied from 1.2 to 2.6 hours across the service. | Initial concerns from staff were expressed although the content of this is unknown. | 97% applications processed in 3 days instead of 2%.<br>Achieved 100% under 3 days with over 60% being processed in a day.<br>All individual regions take their ownership of performance.<br>160% improvement in productivity.<br>New process takes less than 40 minutes instead of over 100.<br>Public are now receiving completed applications quicker.<br>Applications are now processed in 2 months increasing from 64% to 75%. |
| **14.** Local Authority. Aberdeenshire Finance Department | Business consultancy. Ross International, who then trained council staff to be facilitators in Lean, therefore making them self-sufficient | Reacted to change due to comply with national targets. | Initial concerns from staff were expressed although the content of this is unknown | No specific examples were reported other than numerous improvements were made across the department. |
| **15.** Government Department. (National Probation Service, London) | Business consultancy 'Ad-Esse Consulting Ltd' | Some probation offices had a 25% caseload 'in breach' whilst others consistently had below 5%. Different approaches were being taken leading to poor communication, original casework wasn't organised leading to delays, no standard organised paperwork meaning extra time spent searching through files for necessary documents, few document checklists, no visible management system when applied to enforcement for staff tasks. | None Known | Reduction in overall cycle time by between one and four weeks.<br>Reduction in paperwork of up to 75%.<br>Visible management system introduced.<br>Reduced checks in the process.<br>Reduction in errors, as in the return rate from Court teams due to poor quality cases.<br>Reduction in process steps and handovers.<br>Procedures updated and linked to process. |

Reference numbers refer to numbers on page 233.

**Table 2.5 PS Case Study Analyses**

*Source: Author*

## 2.4 Critical Analysis

The literature review has provided an insight into the Lean philosophy and examined issues that may affect its transferability into the PS. This section reflects upon those key issues that will be used to inform the methodology and considered along with the case study analysis to help recommend a new lean framework.

### 2.4.1 Lean issues from Manufacturing

Lean is used by manufacturing organisations to eliminate waste from their processes and is achieved to provide benefit for the end customer in terms of ensuring quality, reducing cost and delivering only what is required and when.

#### Tools and Techniques

The amount and range of lean tools and techniques used in manufacturing is vast and they work together to create a streamlined system to ensure quality, productivity and the rate of goods according to customer demand is maintained. Lean tools and techniques are constantly being enhanced and their selection for use must remain context specific which suggests not all of the lean tools and techniques are necessary for each case. Process mapping is used by all levels of staff to identify where hidden wastes lie within processes and to help achieve improvements.

#### Barriers to lean implementation

Although the manufacturing case studies suggest the Lean philosophy can help achieve benefits there are some barriers to its implementation. Corporate culture and lack of management direction and project sequencing are reported as problematic to lean implementation although these can be avoided if policy deployment is incorporated within the organisation's strategy. Lean also takes a long time to become established throughout the organisation and is confounded by inconsistent and changing requirements from external sources**.**

#### Caveat of lean implementation

Lean is criticised as focusing only at operational level rather than incorporating the organisation's strategy because the range of tools and techniques are designed

for use on the shop floor. A contradiction exists with this finding as policy deployment has already been identified within the academic literature to maintain strategic alignment if it is incorporated as part of the manufacturing organisation's strategy. The academic literature also suggests lack of buffers within the production process causes staff to work harder and reduces their discretion in their pace of work which may lead to poor staff morale and increased Health and Safety issues due to the increased work pace. This finding may be challenged as the academic literature suggests the success of lean depends on the involvement of all levels of staff throughout the organisation by incorporating continuous improvement activities. The organisation is then able to make maximum use of its skilled workforce and use less human effort as well as less space, investment and development time.

### 2.4.2 Lean issues from the PS

Most of the PS organisations within the UK acknowledge their need to become lean is to comply with meeting national targets and provide customer expectation. Although the case studies did not specify their main policy driver, it is likely to be Government initiatives such as the Comprehensive Spending Review (2007) and the Spending Review Framework (2010) that have replaced the original motivator which was the Gershon Report (2004). Effective leadership, especially by the Chief Executive and achieving key performance indicators (KPIs) were other essential drivers for change.

### Tools and Techniques

Limited academic evidence exists into how PS organisations have already used and devised lean tools and techniques specific for their needs. It is questionable whether the full range of lean tools and techniques are applicable for use in LG as their intended use and design are for manufacturing organisations. The amount of lean tools and techniques used in the PS are fewer than those used in manufacturing which could be explained by the choice of change agent or the PS having insufficient knowledge and experience of lean. Process mapping was the only tool and technique to be used by each health care and LG organisation whilst

continuous improvement / PDCA / kaizen workshop, problem solving and standardisation were partially used by LG.

Barriers to lean implementation

Reasons for lean's potential failure in the PS include human related problems such as resistance to change, a lack of support and poor communication between management and employees. Further difficulties expressed by academics were a lack of direction, lack of adequate project planning and lack of project sequencing. It has also been stated that it takes a long time to create a lean organisation and corporate culture is often blamed for its failure. This suggests it is important to stress the extensive process it takes to implement lean across the entire PS organisation and adequate support and training must also be provided by the lean change agent to ensure its effective use.

Caveats to lean implementation

A high expectation amongst staff in the PS case studies for lean to bring quick changes highlights a concern for its transferability into the PS as the academic literature has reported lean's transition across any organisation is a slow process. Cultural issues such as lack of commitment from staff, insufficient support from senior management and resistance to change are all factors which need further investigation and may prohibit lean's sustainability in the PS. Reluctance from staff towards lean implementation appeared to be associated with lean's automotive background. Therefore, the terminology associated with the training needs to be contextualised within the PS.

### 2.4.3 PS Analysis

Productivity in the PS is complex due to variations in demand, quality and the time difference between outputs and outcomes being provided from its vast range of services. The inclusion of quality as well as quantity being part of its production process further complicates PS productivity measurement. A lack of academic literature exists to describe how productivity is measured in LG apart from the use of KPIs and departments tending to focus on characteristics specific to their type of service provision. Productivity and issues of measurement in LG is complex

mainly due to the multi-faceted nature of its service provision. Because each department is unique, where measurements of productivity vary, this makes the task of implementing a high level lean diagnostic tool aimed at the department's strategic level very difficult. Therefore, this suggests a 'one-size fits all' approach to a diagnostic design in the PS should be avoided although it would otherwise work in the Manufacturing sector due to similar processes being shared.

Limited empirical research exists regarding the use of lean-based models across the PS however, PS case study examples were used in this review to investigate how lean-based models have so far been developed and used in comparison to the model used by Toyota. This evidence suggested lean-based models have been adapted to suit the needs of each PS organisation whilst their model titles reflected the purpose of the organisation whilst refraining from the term 'lean.' Most categories suggested and used by Toyota for lean model success were adopted by the PS case study examples although it is too soon to report or predict their success regarding issues of lean sustainability. Information obtained from the lean-based model case studies suggested the most important factor for organisations seeking to use lean and ensure its sustainability is to possess a positive organisational culture and share the same mind-set across the company. Policy deployment and the use of internal lean leaders were strategies used by PS case study examples to address this issue.

The chapter suggested lean may be transferable into the PS although there is a lack of empirical evidence to support the effects of lean used in LG. Much of the evidence to support lean's success in the PS is being used in health care although it is too early to report of any sustainable success where the amount of lean tools and techniques used across organisations in the PS is inconsistent. Evidence from the PS case studies suggest most of the transitions to lean are carried out by business consultancies who are experienced in manufacturing techniques but have little experience of the PS.

2.4.4 Areas to be considered in the Research

Key issues have been identified from the academic literature that are required to assess the transferability of lean into LG. These will be addressed in the methodology and used towards recommending a new lean framework:

1. What are the policy drivers and expectations from using lean?
    - Identify which policy drivers and reasons for change are provided before using lean.

2. How appropriate is the lean model, including its techniques and process?
    - Model - is the lean model and diagnostic tool easy to understand and use? Is the model relevant for the organisation and how effective is the change-agent?
    - Lean Tools and Techniques - how useful are the lean tools and techniques and are they easy to understand?
    - Appropriateness - how does lean compare to other productivity models used before the lean intervention?

3. What are the factors that may influence lean implementation success?
    - Process - what are the effects of the lean intervention upon time, resources and productivity for LG?
    - Organisational Culture - what effects does organisational culture have upon the lean intervention?
    - Sustainability - are there any training issues and how do they affect future use of lean within the organisation?
    - Barriers - what other problems are encountered that could affect lean's implementation success?

4. Have the intended outcomes been achieved?
    - What benefits can be achieved from the lean intervention?

# Chapter Three
# Research Methodology

## 3.1 Introduction

This chapter provides a description and justification of the research methodology that was used during this stage of the research project.

The literature review suggested lean may be transferable into Local Government (LG) although there appears to be gaps in the information found in the empirical evidence to support its long-term success in the sector:

- Limited knowledge exists into the motivation for LG seeking to adopt the Lean philosophy.
- Lack of evidence to suggest how LG has devised lean tools and techniques specific for its needs.
- Limited knowledge exists into how LG has already used lean tools and techniques.
- Lack of knowledge into the effects of lean in LG.
- Limited knowledge exists regarding the use of lean-based models in LG.
- A lack of academic literature exists to describe how productivity is measured in LG apart from the use of key performance indicators (KPIs) and departments tending to focus on characteristics specific to their type of service provision.

## 3.2 Aim of the Research

The research has two aims:

1. Assess the transferability of the Lean philosophy and its associated elements from the Manufacturing sector to LG.

2. Recommend a framework to aid the success and operational performance of lean tools and techniques within LG.

The aims can be addressed through evaluating the transferability of lean into LG. Key contextual implementation success and failure factors were identified and used to recommend a framework to aid the success and operational performance of lean tools and techniques to LG.

Access to these sectors was made through North East Consultancy (NEC). NEC has a basic lean model that is manufacturing derived and is not empirically tested, which was used as the basis of model and process evaluation.

### 3.3 NEC Model

This section describes the background, process and content of the NEC model which was obtained through interview and observation.

NEC Group is a North East Business Consultancy providing advice and support for various sectors including LG, National Health Service (NHS) and manufacturing industries who are seeking to adopt lean productivity techniques. NEC also works in close partnership with local further education colleges to provide National Vocational Qualification (NVQ) level 2 training in Business Improvement Techniques (BIT). This helps employees of those companies implementing the Lean philosophy to gain a working knowledge of lean techniques and enables their company to become better equipped in terms of productivity and ensuring long-term sustainability. Although NEC's roots lie in the automotive and manufacturing industries it was only in 2006 that they expanded their portfolio of activities to include LG. NEC recognised there was a need to keep up with the global trend of industry which is changing its focus from manufacturing to services. NEC was selected as the focus of this research because they are the only consultancy in the northeast region to practice lean and although their model is manufacturing based they have attempted to adapt it to suit the needs of LG. Case studies using the NEC model from LG have been selected as part of this investigation.

NEC uses the same generic model in their approach to LG in the same way for any other industry seeking their support as they view it as a tried and tested

method that is able to measure productivity outputs and therefore relates to any organisation. However, an additional element exists in the model being delivered to LG known as the Service Excellence Needs Analysis (SENA). The content of the NEC model used in LG includes a Productivity Needs Analysis (PNA), Service Excellence Needs Analysis (SENA) and a BIT programme which is an NVQ level 2 training package (Figure 3.1). This enables employees to gain practical knowledge in lean techniques and therefore aims towards improving the organisation's efficiency strategy. An alternative three day Lean Foundation course (LF course) is provided for those organisations only wishing to gain a basic understanding into lean techniques where the BIT programme required for the NVQ level 2 is omitted. NEC believes the model is transferable to LG because it focuses on root cause by placing the customer as the central point to productivity improvement in the same way as manufacturing.

The PNA is a business diagnostic tool derived from manufacturing and is used to measure the impact of any improvement activity within an organisation or department. Data relating to factors affecting cost or quality is obtained to identify the priority areas of lean implementation. It is used during the initial consultation stage between the lean consultant and senior management of any organisation seeking to improve productivity. The delivery of this stage is delivered in the same way for the BIT programme and LF course. Each of the interventions include an initial meeting between the lean consultant and LG senior management team as part of the introductory process and is an opportunity to outline the requirements and purpose of the PNA. A follow-up meeting is then held where part of this time is used to discuss the PNA document in more detail so that any data obtained from its completion would help highlight any areas of concern affecting quality, cost and performance. The responsibility for the completion of the form lies with the senior manager of whose department is due to undergo NEC's intervention.

The SENA is the next stage in the process lasting two days and includes both senior and junior staff from the department as well as representatives from other departments acting in the role of 'challenger' to the event. This practice is otherwise known as process mapping. The aim of the SENA is to help staff at operational level identify and prioritise areas of concern within their department

and work towards solving these through an action plan. The delivery of this stage is delivered in the same way for the BIT programme and LF course which is carried out by the lean consultant. Each intervention begins with the team completing a current state map using process mapping to identify concerns within their departmental process and a future state map later created to compare what could be achieved in an ideal state. The purpose of the action plan is used to help the team eliminate non-value added activities from their current process and work towards achieving the ideal state.

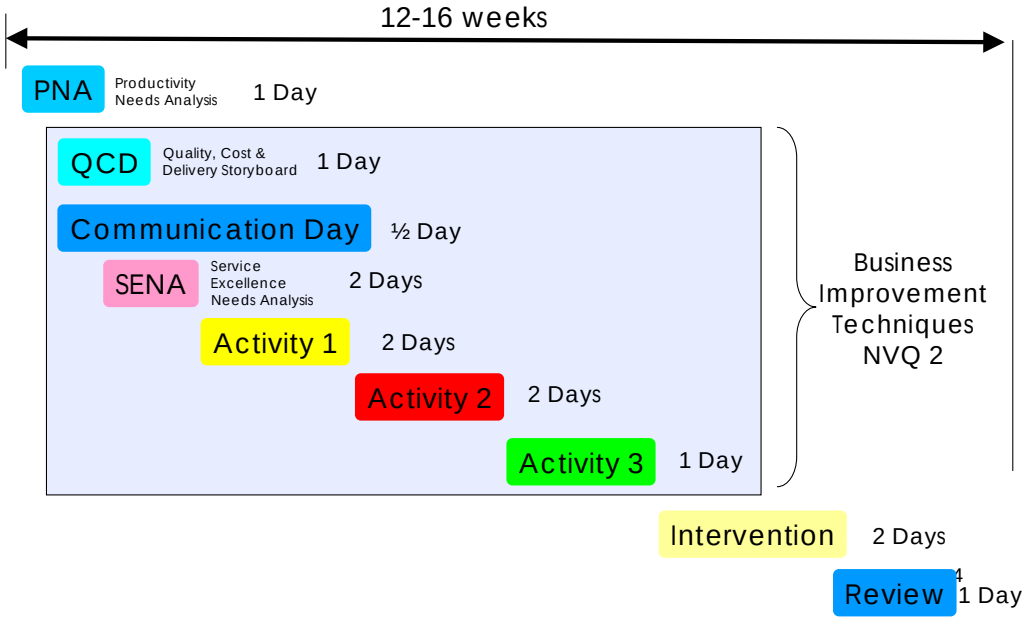


**Figure 3.1 NEC Model**

NEC report their productivity roots are seen to lie in the Nissan automotive Company, and lean influences are taken from Toyota and those as reported by Womack et al (1996), chiefly by understanding the needs of the customer, identify and eliminate waste and focusing on non-value and value-added activities. These aspects are all delivered to LG by NEC and are demonstrated by means of assessing the needs of the customer at the PNA stage. Any area of productivity that is seen to be wasteful is then identified through the use of the PNA and SENA.

The next stage involves teamwork within the LG organisation to identify which work related activities creates no value for the end customer and can be eliminated so that only value added activities exist. The delivery of this stage is delivered in the same way for the BIT programme and LF course which is carried out by the lean consultant. Deming's Plan, Do, Check, Act (PDCA) process is also used by NEC in all interactions with various organisations to measure any results and apply appropriate action if necessary. As part of this strategy NEC addresses this by incorporating a further six lean techniques taken from the NVQ level 2 BIT programme. The lean consultant is replaced by an NVQ facilitator for those organisations adopting the BIT programme once a process for improvement has been identified. The process for improvement is carried out by the BIT participants with contact from the NVQ facilitator on a weekly basis. The role of the NVQ facilitator is to assess the participants' ability of meeting the NVQ required standards of competency in lean tools and techniques. No further contact is made with the lean consultant for those adopting the LF course until the intervention is complete. The lean consultant provides feedback in the form of an A3 Storyboard using PDCA to the organisation on completion of the model. NEC believes this model is a suitable means of addressing the needs of any organisation who are wishing to improve upon productivity performance using the Lean philosophy.

### 3.4 Research Paradigm

The focus of the study was based upon a combined qualitative and quantitative approach. The qualitative approach is inductive and was used in the study as the dominant paradigm because the aim of the research was concerned with enquiring about processes and gaining an understanding of a situation. Further justification of using a combined approach can be explained by Patton (2002) who explains qualitative data can give substance and meaning to quantitative analysis which adds depth and meaning to the study. The intention of using quantitative data in this study was to support the qualitative data and help correlate or dispute findings. A study conducted by Gilmore et al (1996) revealed that qualitative research methods are best suited to the service sector. This is because the characteristics of services are an integration of processes and performances and involve interaction between people which are predominantly intangible meaning it

is difficult to research using a quantitative approach. Gilmore et al (1996) explains the adaptability and flexibility of qualitative research methods has its benefits where:

*'It allows the researcher in the early stages of the study to become familiar with the areas of interest, explore the field and consider the dimensions due to their non-preordained nature.'*

This contributes to the development and understanding of the subject and allows the researcher to see connections and influences on the area of interest. Qualitative data allows the researcher to obtain a more varied and richer source of information which quantitative data cannot provide alone due to its statistical interest.

Exploratory research is the most appropriate method for use in case studies when information is required to discover new or emerging subjects (Yin, 1994). It is for this reason that an exploratory case study approach was chosen for this project because a cross-section of new information focusing on contemporary events with lean was required to recommend a framework for lean's success in LG. Furthermore, Sekaran (2000) states case studies are necessary when information is needed that involves in-depth, contextual analyses of similar situations in various organisations. The case study method was therefore appropriate for this project because comprehensive information was required to understand the processes and experiences associated with the transferability of lean across LG departments. This research therefore did not begin with testing a theory but rather involved using analysis of the collected data to explain emerging themes and allow the issue of transferability to be addressed.

### 3.5 Approach

This section describes the approach that was taken during the research as illustrated in Table 3.1. It included three phases and began with obtaining data from personnel and documentation involved in each case study. This information

was then analysed in order to address the research aims and help to develop and recommend a new framework to aid implementation success within LG.

| Phase 1 | Phase 2 | Phase 3 |
|---|---|---|
| Data Collection | Analyse Data | Recommend a new Framework |

**Table 3.1 Approach to Methodology**

This research project used a case study approach based upon multiple sources of evidence. The use of multiple sources of evidence in case studies allows the researcher to address a wide range of historical, attitudinal and behavioural issues and the finding of information in a case study is more convincing and accurate if it is based upon several different sources of information (Yin, 1994). Furthermore, case studies using multiple sources of evidence are rated more highly in terms of quality than those using single sources of evidence (Yin et al, 1983). The decision to use multiple sources of evidence in this case study approach was therefore thought as the most appropriate method as accuracy was paramount. The use of semi-structured interviews was used as one method because this lends itself well to exploratory case studies as identified by Saunders et al (2003) where he explains the result of this approach allows for a rich set of data to be obtained. The second method was quantitative evidence obtained from documentation used by the lean consultants and the client. It was anticipated this evidence would help to correlate evidence obtained from the semi-structured interviews. The method of using data accessed from multiple sources is a term known as ‘triangulation.’ The concept of triangulation is based on the assumption that any bias in any of the data sources is neutralised when used in conjunction with other data sources and methods (Jick, 1979). This process strengthens interpretations and improves the quality of research that can reduce the impact of any biases which increases the

validity of the study (Yin, 1994). This study used ‘data triangulation’ where evidence was sought from various groups of people across nine disparate case studies and at different levels within the LG organisation having used the lean intervention. These groups of people included senior managers and departmental staff as well as lean consultants who delivered the intervention.

As the research was based on multiple case studies using multiple sources of evidence this approach according to Yin (1994) uses replication logic. Yin (1994) describes replication when used in multiple case studies as being similar to those used in multiple experiments where if similar results are obtained from all cases then replication is said to have taken place. The reason behind using replication is to either predict similar results as in literal replication or to produce contrasting results but for predictable reasons as in theoretical replication (Yin, 1994). Both results then lead to the development of a rich theoretical framework. The benefit of replication is that if similar results are found in several case studies then more confidence in the overall results is achieved (Yin, 1994).

The way in which replication is carried out in case studies is illustrated in Figure 3.2 as adapted from Yin (1994). The figure indicates that the first step in designing the study is to identify the research question and it shows that case selection and the design and data collection stage are important steps in the process. Information from each individual case study is sought and their conclusions are then considered to be the information required for replication by the other case studies. The results from each case study are reported and followed by an overall analysis of the extent of the replication logic explaining why certain cases were predicted to have certain or contrasting results.

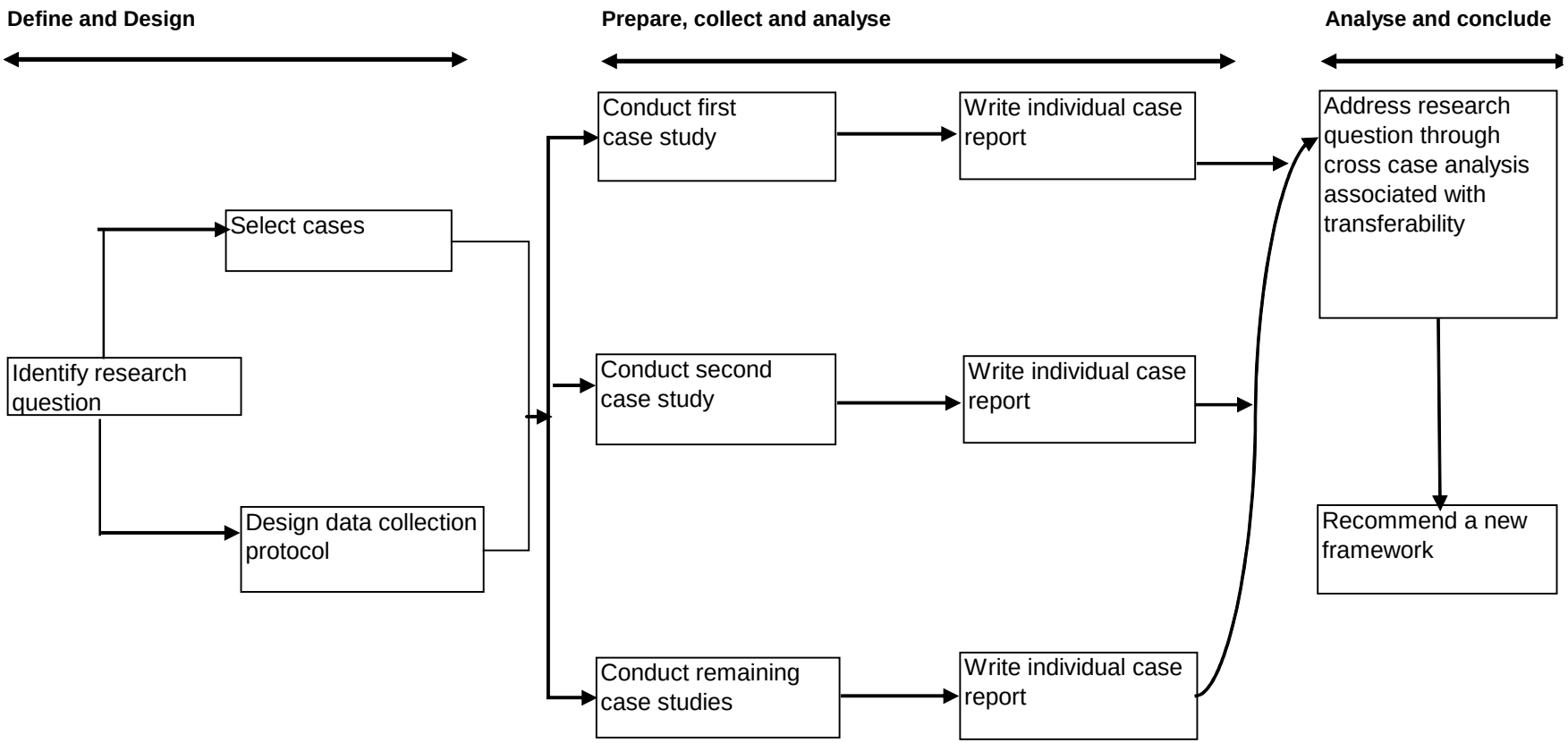


**Figure 3.2 Case Study Method adapted from Yin (1994)**

This research used an adaptation of Yin's case study method illustrated in Figure 3.2 that adopted a replication logic using case studies within nine departments across three LG organisations. It discovered if productivity improvement techniques developed for manufacturing can be transferred to LG. The nine individual case studies were repeated in the same way to discover whether the results from each case were similar and to understand the reasons for this. Once the results were analysed from each case study it became possible to develop and recommend a new framework to aid the implementation of lean within LG. The use of replication in this study was appropriate because it related back to the aim of the study, which was to discover whether productivity improvement techniques developed for manufacturing could be transferred to LG. The aim was therefore to determine if the same results could be found in several case studies as represented by LG departments.

Selection of the case studies was based upon availability and opportunity as it was impossible, during the data collection phase, to predict whether NEC would be approached by a new LG client requesting their intervention. Purposive sampling was used in this study to select cases and individuals. It is defined as:

'*The selection of information-rich cases is used for in depth study. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research, thus the term purposeful sampling.'* (Patton, 2002).

This approach is confined to seeking information from specific groups of people and is often used within case study research (Saunders, 2003). These target groups may be the only ones who can provide the required information whether it is because they are the only ones who have it or it conforms to some criteria set by the researcher (Sekaran, 2000). Purposive sampling was therefore appropriate in this study because there was a need to obtain information that could only be sought by certain people, which in this case were those from LG departments using NEC interventions. These included: (1) a lean consultant involved in each LG intervention, (2) one senior manager from each case study and (3) one to two departmental members of staff from each case study. The number of LG departmental staff available for interview was restricted by availability and

opportunity as the study was only interested in those who had completed all parts of the lean interventions and NVQ training so that accurate insight and understanding of their experience could be obtained. This was a variable range, where the average number of departmental members of staff in each case study completing all parts of the lean interventions and NVQ training was five.

### 3.6 Data Collection

These case studies involved an inductive approach using semi-structured interviews involving the lean consultant and representatives from the LG departments adopting lean. The representatives were senior management who had an interest in the lean project and departmental staff involved in the lean activities. Information from the lean consultants such as the PNA and statistical information provided by the LG department were used to help correlate data from the semi-structured interviews.

The unit of analysis throughout the project was considered as the lean intervention. Each case study involved in the lean intervention comprised of three sub-groups including the lean consultant, the client's senior management team and departmental staff involved in the lean activities. It was noted there could have been a possibility that several departments may have been selected by the LG organisation to adopt NEC's intervention. In this instance, each department involved in the lean intervention was classified as a case study. The purpose behind selecting these case studies refers back to the aim of the project, where the focus is interested in discovering whether productivity improvement techniques developed for manufacturing can be transferred to LG. The case studies in this project were therefore relevant because they reflected information from a cross-section of the group which fulfilled the criteria in the aim of the study. A pilot study was used for the first case study and amendments were carried out as necessary.

The approach that was used to collect data is illustrated in Table 3.2. This shows who was approached during the study and the type of information that was accessed to help formulate a new framework. The decision to involve three categories of respondents can be justified:

Lean consultant - Interviewing the lean consultant involved in the lean process helped to discover both barriers and areas of success throughout the intervention with the LG authority. Any organisational cultural influences upon the lean intervention were also examined.

Senior management - Information received from senior management within the particular LG organisation revealed if the lean model being delivered achieved any intended outcomes, revealed any barriers to implementation, if there was a need for changes to the model and whether the model was sustainable and appropriate for their organisation.

Departmental staff - Interviewing departmental staff involved in the lean activities revealed whether the lean model met their expectations, discovered the level of support from senior management, if the amount of lean techniques used was sufficient and appropriate for their departmental needs and identified any barriers during the process.

| Source | Type of Data | What the information identified |
|---|---|---|
| Lean Consultant | Qualitative data (Semi-structured interviews) Quantitative data (Documentation) | 1. Barriers and areas of success during the intervention.<br>2. Organisational cultural influences upon implementation of the model. |
| Senior Management | Qualitative data (Semi-structured interviews) Quantitative data (Documentation) | 1. Achievement of any intended outcomes.<br>2. Barriers to implementation.<br>3. Identify any necessary changes to the model.<br>4. Sustainability issues of the model upon the organisation.<br>5. Was the model appropriate for the organisation? |
| Departmental Staff involved in the activity | Qualitative data (Semi-structured interviews) | 1. Did the model meet their expectations?<br>2. Sustainability issues affecting staff.<br>3. Discover whether the amount of lean tools and techniques was sufficient and appropriate for their departmental needs.<br>4. Discover any barriers and success factors during the process. |

**Table 3.2 Data Collection Approach**

The selection of respondents was straightforward. The lean consultants assigned to the LG lean project were aware of the intentions of this study and full co-operation was therefore guaranteed from NEC. Each of the LG senior managers were approached from the commencement of the lean project to gain their commitment. The selection of departmental staff involved in the lean activities was made by obtaining a list of names and contact details so they could be approached to secure their involvement. Data from documentation such as the PNA was obtained from the lean consultant assigned to the particular LG organisation involved in the lean project. Additionally, statistical information obtained from the LG organisation was requested at the beginning and end of the lean project to identify any areas of success or failure during the process.

Schedules of questions were prepared and issued to the respondents before the interview occurred (Appendix 2). These questions were derived from the research aim and also evolved from the literature review. The interviews were recorded onto a digital recorder to allow for transcription and each interview lasted between 45 and 60 minutes.

### 3.7 Data Analysis

This section describes the methods that were used during the data analysis phase of the research.

The data obtained from the semi-structured interviews was recorded onto a digital recorder to allow for transcription and analysis. Each transcript had its own coding system relating to the specific case study where the information included the respondent's organisation and job position. This process had two benefits. First, it ensured anonymity for the finished work and secondly, it assured co-operation from the respondents during their involvement in the interview.

Each of the codes corresponded to a thematic question based upon the findings of the literature review and was placed onto a matrix for analysis (Appendix 1). The software for the process was 'Microsoft Word.' A pilot study was used for the first case study results to allow for necessary changes to the method. The analysis of

the coded files was then carried out to discover emerging patterns and used to recommend a new lean framework.

Statistical data obtained from documentation used in the case studies was stored onto a table using Microsoft Excel to illustrate and discover the amount and type of lean tools and techniques used in each case study. Each of the tables related to the individual case studies using a coding system relating to the organisation and department.

### 3.8 Recommendation of a new Framework

Following analysis of the data it would become possible to recommend a framework to increase the rate of success within LG Departments.

### 3.9 Research Validity

Yin (1994) identifies three aspects that must be used when considering validity in exploratory case studies. These include:

1. Construct validity. This involves establishing correct operational measures for the method being used and to avoid subjective judgements when collecting data.

2. External validity. It is important to establish the domain to which a study's findings can be generalised.

3. Reliability. The researcher must demonstrate that the operations of a study can be repeated with the same results, such as the data collection phase.

This approach was used to demonstrate the validity and reliability in this research methodology.

The research project used multiple sources of evidence to ensure that the converging lines of enquiry were met as in the case of 'construct validity.' These

included semi-structured interviews and documentation obtained from the lean consultant and the LG organisations. Furthermore, semi-structured interviews in the case studies were recorded using a digital recorder before being transcribed into a 'Word' document. These were played back to ensure the content of the interviews were correct and any errors were amended. The use of quantitative data from statistical documentation would also correlate with any qualitative data received. Both of these methods therefore met the criteria of reliability.

The criteria to meet external validity were achieved by using a replication strategy from multiple case studies in LG departments. These case studies involved an inductive approach using semi-structured interviews involving the lean consultant and representatives from the LG organisations adopting lean. Quantitative data was used from the documentation used by the NEC Consultant and the client in each case study to help correlate findings obtained from the qualitative analysis.

### 3.10 Ethical Issues

According to Saunders et al (2003), privacy is seen as the basis of the ethical issues that involves those who carry out research in business. In order to meet the requirements of confidentiality there are certain measures that were used throughout the study.

Anyone taking part in the interviews were made aware of the purpose of the study and the methods of collecting data. They were made aware of their rights to terminate their involvement in the study at any time as well as being assured of their anonymity and confidentiality. It was made clear to the respondents that the data would be made public within the published thesis although they would not be identified due to the coding process used in the data collection phase.

### 3.11 Summary

This chapter has described and justified the aims of the methodology that was used during this stage of the research project. Measures were taken to consider

the transferability of lean into LG and to recommend a framework to ensure its success.

A multiple case study approach was taken to accommodate the exploratory nature of the research which adopts a combined qualitative and quantitative approach. Multiple sources of evidence using an inductive approach were made in the form of semi-structured interviews involving the lean consultant and representatives from LG. Information from the lean consultants such as the PNA and statistical information provided by the LG department were used to help correlate data from the semi-structured interviews. Analysis of the data enabled the recommendation of a new lean framework for implementation within LG. The results of this data will be discussed in chapter four.

# Chapter Four
# Case Study Analysis

## 4.1 Introduction

The purpose of this chapter is to address the research question ‘is the Lean philosophy transferable into Local Government (LG)?’ The chapter describes the results and analysis from case studies adopting NEC’s lean model. It goes onto describe how the information could inform a new lean framework by identifying information in four sub-question headings:

1. What are the policy drivers and expectations from using lean?

2. How appropriate is the lean model, including its tools, techniques and process?

3. What are the factors that may influence implementation success?

4. Have the intended outcomes been achieved?

An overview and comment about each of the case studies is provided before examining responses from semi-structured interviews using the four sub-question headings. These were obtained from lean consultants, senior managers and departmental staff in their involvement with NEC’s lean intervention. This is presented as a cross case analysis obtained from respondent groups which was derived from an individual respondent analysis found in Appendix 3. The results were evaluated in the four sub-question headings using results from the group analyses. The chapter ends by summarising significant findings from the data by answering the research question. Figure 4.1 provides a schematic representation of this chapter:

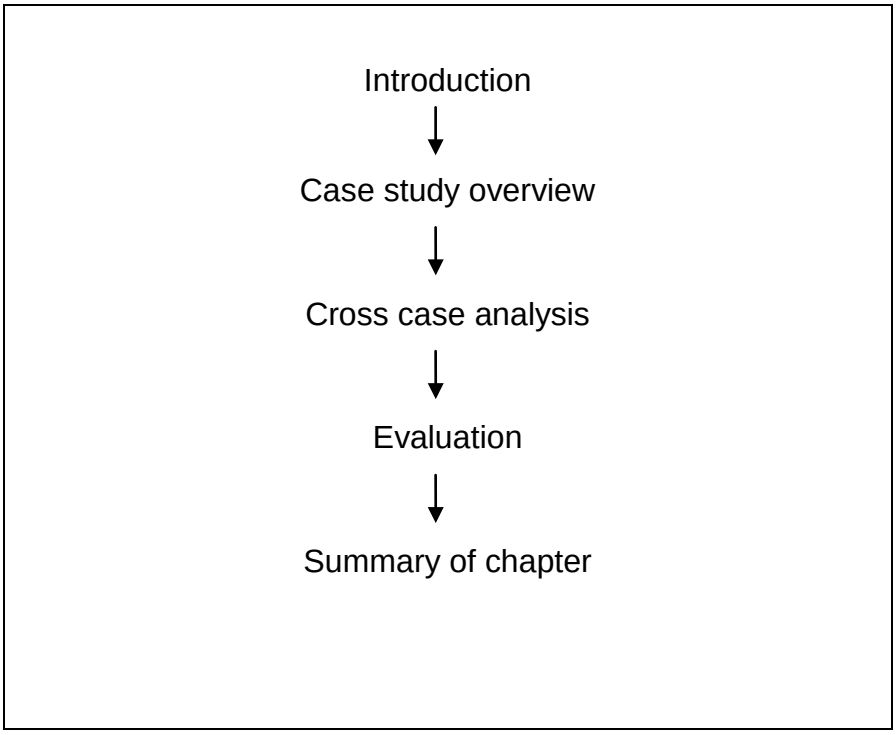


**Figure 4.1 Structure of Case Study Analysis Chapter**

### 4.2 Case Study Overview

Table 4.1 illustrates an overview of each of the nine case studies. The focus and aims and objectives of the case studies were verified using data received from semi-structured interviews of participants documented in the individual case study analysis (Appendix 3) and from NEC internal reports. Specific data relating to situations before and after NEC's interventions were obtained from NEC's intervention summary reports although generalised confirmation about the success of the interventions was discussed with participants. Table 4.1 lists the type of department under each of the case study headings, the focus of the groups, their aims and objectives, situation before the intervention and position on close of the activity.

| Category ……. Case Study | Focus | Aims and objectives | Situation before NEC intervention | Situation following NEC intervention |
|---|---|---|---|---|
| **1.** Postal Process.<br><br>Local Authority A | The scope of the postal process was decided to be from when the post arrived from the Royal Mail to the point where outgoing mail arrived in the post room. For the purpose of the study a current state map was generated from the 'procure to pay' process. | • Staff to have mail delivered at a set time each day.<br>• To get staff to use correct sized envelopes. | A total of 29 steps were mapped out from the start of the process to the end. Only 13 (45%) of the steps added value. | • Labour saving by changing the collection procedure to revenue assistants collecting mail on their normal routine.<br>• Outgoing mail is now sent in the correct package size saving 1.5 pence per item.<br>• Mail is currently delivered to the Civic Centre at any time during the morning. The group identified it would be beneficial to have a set delivery time from Royal Mail which would allow the post to be sorted and internally delivered to each department by up to 2 hours earlier. |
| **2.** Procure to Pay.<br><br>Local Authority A | Focus of study was from procurement of goods or services through to issuing their payment. An analysis of the procedure was made from when an invoice arrived through to when a cheque is printed for its payment. | • To improve the percentage of invoices paid within 30 days.<br>• Review and improve existing mechanisms associated with procurement to payment. | A total of 24 steps were mapped out from the start of the process to the end. Only 10 (36%) of these steps added any value.<br>A total lead time for one transaction was identified as 3318 minutes (55 hours). | • Manual handling of invoices, recording and dealing with queries - savings of £420 per annum.<br>• Processing charges for direct debit reduced from £26.10 per annum to £10.40.<br>• Processing time for BT invoices reduced from 3000 minutes to 15 minutes.<br>• 5S standard improved from 11% to 62%. |

| | | | | |
|---|---|---|---|---|
| **3.** Development Control (a).<br><br>Local Authority A | The scope of the project in the Planning Applications process was from when the application arrives by mail into the Planning department through to the application being filed away following a decision being made and the applicant being notified of the decision. | • Reduce 8 week lead time<br>• Achieve 80% of householder applications in 8 week target.<br>• Ensure actual cost aligns with £135 application fee. | A total of 66 steps were mapped out from the start of the process to the end. Only 23 (35%) of these steps added any value. | • Process achieved zero defects throughout the period of the improvement intervention.<br>• Cost savings of £982.26 per annum.<br>• Lead time reduced by 444 minutes.<br>• Process reduced to 55 process steps in total.<br>• New procedures written for new methods.<br>Staff trained in new methods. |
| **Category …… Case Study** | **Focus** | **Aims and objectives** | **Situation before NEC intervention** | **Situation following NEC intervention** |
| **4.** Payroll and Human Resources.<br><br>Local Authority A | The focus of the study was from an offer of employment letter being sent out to a new employee through to the end of employment final payment. | To create a better HR and payroll system from initial hire to final payment to leaver. | A total of 67 steps were mapped out from the start of the process to the end. Only 22 (33%) of the steps directly added value. | • Zero defective applications received after changes during the project. Previously this was one per a two month period.<br>• Reduced costs of sending out handbooks - £500 per annum.<br>• £4100 per annum reduction in salary overpayments.<br>• Lead time reduced by 656 minutes by using e-forms. |
| **5.** Street Scene and Parks Maintenance.<br><br>Local Authority A | Focus of the study was from the point of a customer enquiry arriving at the 'Gateway' through to the job card being filed away following completion. | To improve the response time from customer request to carrying out the request. | A total of 37 steps were mapped out from the process to the end. Only 12 (32%) directly added value. These steps covered a total process time of 5469 minutes (91hours). | • New Standard Operating Procedures developed to simplify the enquiry process.<br>• Establish computerized method of recording and identify non-scheduled work to ensure deadlines are met.<br>• Condition of the work area improved by the use of 5S and risk assessment procedures. |

| | | | | |
|---|---|---|---|---|
| **6.** Pest Control and Canine Welfare.<br><br>Local Authority A | Focus of the study was to look at the processes involved in pest control for both domestic and business routes. The group also studied the stray dog process. | Problems were identified that include non-payment, time taken to arrange spread of payments and preparation cost of invoices and their issue. The team planned to identify improvements to make savings and improve efficiency. | A total of 55 steps were mapped out from the process to the end. Only 13 (24%) directly added value. These steps covered a total process time of 5983 minutes. (100 hours) | • Labour saving of 11 minutes 30 seconds has been achieved.<br>• Potential savings of £157 per year with the eradication of erroneous invoices.<br>• The amount of errors on the invoices and retrospective orders has been reduced.<br>• Standards developed.<br>• Improved morale (Time available for staff development)<br>• Improved training material to ensure that new starters have the best information. |
| **Category …… Case Study** | **Focus** | **Aims and objectives** | **Situation before NEC intervention** | **Situation following NEC intervention** |
| **7.** Bookings to Events.<br><br>Local Authority A | Focus of the study was to look at the process of a customer booking an event through to paying the invoice. | • Improve the customer satisfaction levels.<br>• Improve staff safety whilst working alone.<br>• Reduce miscoding.<br>• Reduce time spent on phone calls. | A total of 76 steps were mapped out from the process to the end. Only 39 (50%) directly added value. This covered a total process time of up to 8096 minutes (135 hours). | • Website contacts improved from 9 to 643 per month.<br>• Website reduced telephone calls.<br>• All customers receive questionnaire.<br>• Lone working procedures modified and improved.<br>• 5S standards improved.<br>• Risk Assessment issues resolved during the activity. |

| Category ……. Case Study | Focus | Aims and objectives | Situation before NEC intervention | Situation following NEC intervention |
|---|---|---|---|---|
| **8.** Development Control (b)<br><br>Local Authority B | The focus was on the process of a planning application arriving in the Development Control office through to it leaving the service. | Identify areas of opportunity for improving the Planning Application process. | Information not obtained. | • Faster turnaround in processing Planning Applications due to the post arriving in the department 2 hours earlier than before the intervention.<br>• Condition of the work area improved by the use of 5S and risk assessment procedures.<br>• Standards developed. |
| **9.** Corporate Performance Management.<br><br>Local Authority C | Review the role of corporate performance management. | • To design a framework and service that is fit for purpose and delivers what customers require.<br>• To ensure correct process and procedures are in place to support council in transition with changing national context.<br>• To have a service structure and resource that adequately delivers the requirements of all customers. | Purpose statement of start of course:<br>• Drive simple service delivery.<br>• Facilitate effective management, such as resources.<br>• Fit for purpose and act as a tool for inspections<br>• Alignment of objectives.<br>• Reflective<br>• Senior management - confidence of delivery of objectives.<br>• Single information source for Service Managers<br>• Monitoring processes | Purpose statement at end of course:<br>• Understand customers<br>• Define customers<br>• Understand customer demand<br>• Enable simple and effective service delivery<br>• Provide a mechanism for continuous improvement.<br>• Inform / influence and implement 'sustainable communities' strategy' and corporate priorities. |

**Table 4.1 Overview of the Nine Case Studies**
*Source: NEC intervention summary reports*

Figure 4.2 illustrates how the chapter is structured in terms of presenting findings from the case study analysis and cross case analysis. It begins with providing an analysis from each of the nine case studies and progresses onto a group analysis from each LG respondent group involved in the lean interventions. These include (1) lean consultants (2) senior management (3) departmental staff. The same four questions were used across each respondent group to ensure consistency and cross referencing. An evaluation was made based on the findings from the individual case study and respondent group analyses using the same format. This helped towards recommending a new lean framework within LG, to be discussed in the following chapter.

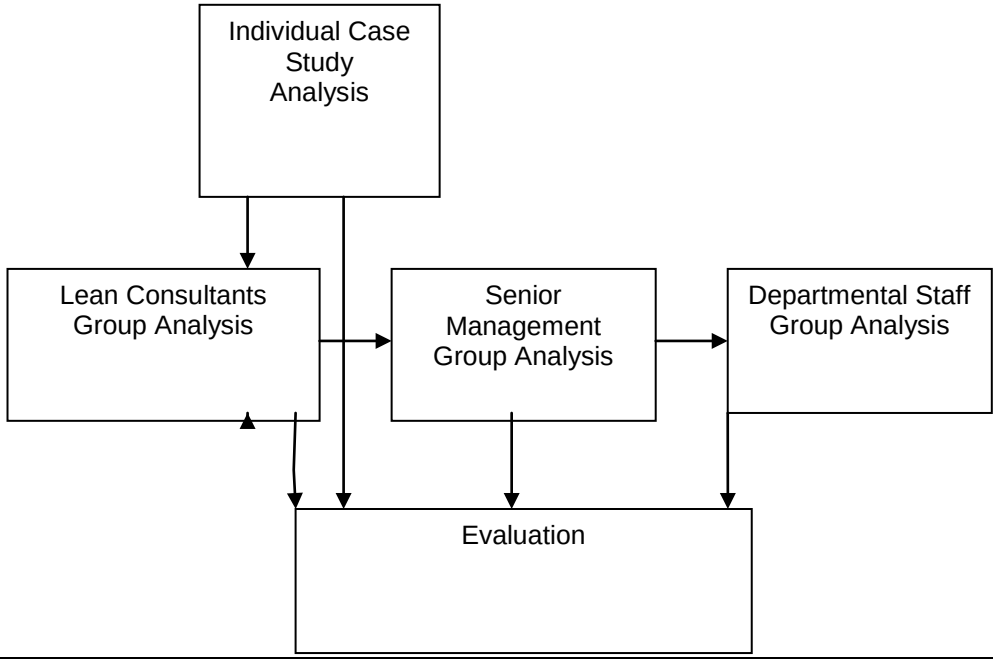


**Figure 4.2 Structure of Case Study and Cross Case Analysis**

A description of the results obtained in each case study using data from NEC's summary reports and verification from semi-structured interviews obtained from participants (Appendix 3) is provided below:

Case Study 1: Postal Process, Local Authority A.

A current state map was generated from analysis of the 'procure to pay' process using process mapping. This revealed that out of the 29 steps only 13 added value and the total lead time was 359 minutes.

Issues identified from the current state map were dealt with by the team through application of the 'Business Improvement Techniques' (BIT) activities. The team arranged for revenue assistants to collect mail from reception on their way past from emptying the letterbox each morning for a trial period. An awareness campaign regarding external mail was created by the team and an article was placed in the staff magazine about postal charges and how much the Local Authority spent on this. Royal Mail postage charges and envelope sizes were also placed in each department throughout the authority and a campaign to send out 2nd class post wherever possible was carried out. The team felt it would be beneficial to have mail delivered at a set time every day in order to minimise waiting time for each department.

Following the trial period the planning department noticed a delay in receiving their mail so it proved that the trial system had made a difference. The change in collection procedure was subsequently reintroduced and made permanent.

All concerns identified that were outside the scope of the team were placed in the 'concerns car park.' This term means any concerns are placed on file so they can be later taken to senior management for discussion and actioned if necessary. The team brainstormed the idea of having the mail delivered at an earlier set time and weighed up the benefits and drawbacks if this was to be introduced. The benefits would allow departmental staff to receive and open their mail much earlier where the drawback would incur a cost implication of £2,850 per annum. It was agreed that the Heads of Service managers would be canvassed as to whether this would prove beneficial for their service as a whole.

Case Study 2: Procure to Pay, Local Authority A

A current state map was generated from analysis of the 'procure to pay' process where the team produced three process maps for different amounts of spend ranging from less than £5,000, £5,000 to £20,000 and greater than £20,000. The analysis showed 10 steps added value to their process and a total lead time for one transaction was identified as 3318 minutes (55 hours).

End users were identified by the team to require further training in the 'procure to pay' procedure. Existing procedures were reviewed and revised and new spreadsheets were designed accordingly. Exemption lists were updated and multiple utility providers were identified so that a reduction of multiple invoice payments was reduced to one.

The I.T department was contacted to set up permission for end users to use a new spreadsheet. Exemption lists were created and the process was also standardised to ensure a greater clarity of the current situation. Budget planning was also tackled to improve payment accuracy.

Training in the new procedures was carried out on a one-to-one basis and procedural notes were developed taking into account the issues raised by end users. Procedural notes and revised notes were then emailed to the Senior Management Team (SMT) and end users. A Risk Assessment was carried out for the new procedure and the Director of Resources was informed of the new processes.

Case Study 3: Development Control (a), Local Authority A

A current state map was generated from analysis of the Planning Application process. This revealed out of the 66 steps only 23 of these added any value. From this, the team developed their action plan to achieve their objectives.

The team identified there were too many 'over checks' being carried out on each application and there were also too many transportations and delays in the process. A decision was therefore made by the team to reduce these non-value added activities from the process.

The team removed three unnecessary steps from the checking procedure. Part of this involved a more thorough checking over of an application by one person rather than passing it onto the Customer Support Team.

The system was tested and set up as a new Standard Operation Procedure. This was carried out by sending an email to Team Leaders who were involved in the process and informed them of the change. The new system was later checked to discover it was working by checking to see if it had resulted in any errors. As no errors were detected the new practice was formally implemented.

Case Study 4: Payroll and Human Resources, Local Authority A

A current state map was generated and included the processes for new starters, casual labour, leavers, expense payments and timesheets. The study showed that out of 67 steps only 22 steps directly added value.

Issues identified from the current state map were dealt with by the team through application of the BIT programme. The team decided to focus on removing transportation and unnecessary distance from their processes including the introduction of electronic forms to reduce unnecessary paper trails.

A pilot group was identified to try out any proposed changes. Discussion was held regarding the introduction of a new standard operating procedure to auto populate forms and letters from the Personnel System. It was felt necessary to introduce a single point of access for Personnel by the introduction of a generic email address and to set up an electronic link to the website for access to the new staff handbook.

In order to maximise the impact of the activities the team developed new operating procedures that outlined the new systems and processes. Staff will be trained in the new systems to ensure reduced variation in the required outputs and to maintain improvements.

Case Study 5: Street Scene and Parks Maintenance, Local Authority A

A current state map was generated from analysis of the response time from customer request through to carrying out the request. This showed that out of 37 steps only 12 directly added value and involved a total process time of 5469 minutes (91 hours).

The current system in place for dealing with customer contacts involved a generation of customer tickets on the Customer Relations Management System (CRM) system. Scheduled work was dealt with immediately or near inception and non-scheduled work generated a 'work ticket' where the workload and resources could result in a delay of several months. The tickets were also signed off before any work was completed. It was recognised by the team to improve customer satisfaction through better scheduling of non-scheduled work and improve on communication with the customers.

The team decided to measure any impact of changes using the headings of 'Quality, Cost and Delivery.' Quality involved a measure of performance against the CRM Service Level Agreements. Cost involved the measure of hourly charge out rates and material costs where delivery measured an improved response time from the point of contact and raised ticket through to completion.

A decision to communicate with all staff involved in the process was made to ensure the new standard operating procedures was understood and implemented. The CRM scripts were reviewed and adjustments were made as required. A new computerised method of recording and identifying non-scheduled work to ensure deadlines was to be introduced.

Case Study 6: Pest Control and Canine Welfare, Local Authority A

A current state map was generated for each of the main value streams. It showed that a total of 55 steps were mapped out from the beginning of the process to the end and only 13 directly added value covering a total process time of 5983 minutes (100 hours).

By mapping the process the team were able to identify where the costs were incurred and be able to discover any concerns about the process. The greatest savings could be made by reducing the amount of invoices raised and by obtaining payment for services prior to them being delivered. Concern was raised about lone working arrangements and these were also reviewed.

An action plan was prepared and tasks were allocated to individual team members. A team meeting was held to discuss the plan and to exchange information and ideas. A decision was made by the team to stop invoices being sent out for domestic pest control customers collecting stray dogs. Payment was to be introduced in advance of the service or at the time of delivery. Pest control officers were trained to use the new system, the web-site was amended, new standard operating procedures were written and publicity about the new service was drafted. The new system was tested, reviewed and then fully implemented after identifying savings and improving efficiency.

An extension of the kennel services was made where telephone calls are now handled 24 hours per day and dogs are collected up until 9pm including weekends. The answer-phone message has been changed to include an emergency out of hour's number which is manned 24 hours per day and provides additional information. The web-site has been improved to give customers more information including the 24 hour telephone number and a pre-warning to callers that there is an additional charge for payments by credit card. Officers are trained in the new procedures and equipment has been purchased with a view of providing a service to micro-chip dogs.

Case Study 7: Bookings to Events, Local Authority A

A current state map was generated from analysis of the 'Bookings to Event' process. This showed a total of 76 steps were made from the beginning of the process to the end and only 39 of them directly added value. In order to address and monitor how the service could be improved, the customer satisfaction survey was reviewed and included more questions. The team ensured results of any customer satisfaction surveys would now be publicly displayed. Staff in the main reception, known as the Gateway, has been approached to review the possibility

of the questionnaires being distributed there, as well as carrying out the data entry and analysis function.

The team identified the web-site was already being used to seek information through general enquiry emails. The team gathered photographs, menus, reports and other key documents to promote the service. The I.T department was approached to seek their assistance with the web-site structure and to provide links for the service. The team discussed possible links to the 'A-Z' and 'Homepage' and researched best practice across other Local Authorities. They also developed web forms and reports, included contact information, web links and search engines to increase the amount of visits to the site. The statistical monitoring of 'hits' was provided by the I.T department.

The customer satisfaction questionnaire was updated with new questions and provided more event details. Responses from the customer satisfaction surveys were displayed in the Gateway. New procedures were implemented for managing lone working such as ensuring more than one person was working whenever possible during late night events and mobile phones were ordered for use on occasions if lone working was to be unavoidable.

Case Study 8: Development Control (b), Local Authority B

A current state map was generated from analysis of the Planning Application process. The focus was on the process of a planning application arriving in the Development Control office through to it leaving the service.

Areas for improving the planning application process were identified. Before NEC's intervention the time in which a planning application was actually in the department for processing was 8 weeks. A target was set by the team to reduce this to 6 weeks so that extra time could be allowed for checking errors on an application before its return to the customer.

A decision to review when planning applications arrived in the department was made to discover whether this had any significant impact upon the total process time. A trial would be arranged with Royal Mail for the post to be delivered earlier

in the day. New Standard Operation Procedures and risk assessments were discussed.

During the trial period the planning department noticed a faster turnaround in processing planning applications due to the post arriving two hours earlier than before the intervention. New Standard Operation Procedures and risk assessments were implemented.

Case Study 9: Corporate Performance Management, Local Authority C

As this intervention took place over a period of three days there was not enough time for the full cycle of the PDCA cycle to occur. A summary of the event is therefore obtained through data obtained from the PNA and action plan. A current state map was generated from analysis of the role of Corporate Performance Management (CPM). The focus was to review their role in line with changes with Government policy due to take place in April 2009.

The team reviewed their current role by evaluating their purpose statement. Part of their role was to gather data from departments within the Local Authority and publish performance reports in accordance with legislation. The CPM team was constantly reminding departments to send in their data on time so their deadline for reporting to Central Government could be achieved. Feedback from 'challengers' to the event who also represented these departments reported reasons for their difficulties in gathering the required data.

An action plan was devised to introduce changes within their role in order to become more user-friendly and adopt a supportive role for their customers within the Local Authority.

Their revised statement purpose was now more customer focused in comparison to their current state. Steps were introduced to bring about these changes in time for the beginning of the new financial year.

Conclusion:

Although the focus, aims and objectives varied in each case study the analysis revealed the lean interventions were successful in achieving short term benefits within each of the nine LG departments. Reducing the amount of wasteful activity, identified during the process mapping stage, enabled LG staff to become more efficient and effectively meet the needs of the customer in terms of reducing cost, improving service quality and increasing productivity. The interventions in the case study analyses tended to focus on administrative rather than operational processes where potential benefits were obtained rather than actual improvements. Therefore, LG could be at risk of failure in their approach to lean if they do not become driven by customer demand which is the basis for adopting lean.

### 4.3 Cross Case Analysis:

This section describes the analysis of replies obtained from each of the three respondent groups in relation to their involvement in the case studies and is obtained from individual respondent replies. Quotations are used from respondents, found in Appendix 3, to help emphasise key points of the data analysis and to describe variance of replies. The purpose is to provide an understanding of each group's experience with lean according to the four sub-question areas displayed in Table 4.2, which are:

1. What are the policy drivers and expectations from using lean?

2. How appropriate is the lean model, including its tools, techniques and process?

3. What are the factors that may influence implementation success?

4. Have the intended outcomes been achieved?

Semi-structured interviews were carried out in accordance to criteria described in the methodology and information was sought relating to issues raised from the

literature review and NEC interventions, listed in Table 4.2, aimed towards addressing the research question. Related literature themes were also used as elements within each of the four question headings to generate further enquiry in order to gain a more in-depth understanding of key lean issues. A list of questions, in accordance with the methodology, aimed towards lean consultants, senior managers and departmental staff was incorporated within a table so that consistency and cross referencing of the replies could be made from each of the respondent categories. The full list of questions and coding system referred in the methodology chapter can be found in Appendix 1.

| Question | Elements |
|---|---|
| **1. What are the policy drivers and expectations from using lean?** | **Policy Drivers** - reasons for change; expectations. |
| **2. How appropriate is the lean model, including its tools, techniques and process?** | **Model** - opinion of each stage; easy to understand; easy to apply; areas that were difficult to understand / implement.<br>**Diagnostic Tool** - PNA; SENA; relevance of model.<br>**Training -** comparison to other models used previously; resources; productivity; departmental needs; organisational needs; customer needs; targeted at right people and level; workload, change agent.<br>**Lean Tools and Techniques -** ease of use; easy to understand; relevance to task; effects on workload; usefulness. |
| **3. What are the factors that may influence implementation success?** | **Process -** effects on time; resources; productivity; relevance to own workload.<br>**Organisational Culture -** involvement from senior management; departmental staff.<br>**Sustainability** - effects on organisational culture; training; senior management; departmental staff; future use of lean.<br>**Barriers** - organisational culture; training; senior management; time; resources; terminology; motivation / reasons for change. |
| **4. Have the intended outcomes been achieved?** | **Benefits** - for department; organisation, productivity, customer. |

**Table 4.2 Table of Case Study Questions**

4.3.1 Lean Consultants

1. What are the policy drivers and expectations from using lean?

The lean consultants reported there are many reasons for LG organisations wanting to adopt lean and the main reason is due to the environment in which organisations are operating, where customers are demanding and there is a wide variety of choice. More pressure is placed on LG to meet customer demand whilst they have to achieve shorter lead times and work within tighter budgets.

Through the lean consultants' experience, LG is attracted to the lean approach because its emphasis is on the customer and it identifies customer demand and meets their needs. This reason for change was given by the LG organisations seeking to use NEC's intervention, particularly with regard to the current economic climate and needing to meet strategic drivers set out on a five year basis. This includes what the organisation is going to achieve, how they are going to engage with their customers and work with their partners plus how they can improve their cost base. Lean is therefore seen by them to act as a method to help meet those objectives. In support of this finding Consultant 2 reported there were many unnecessary measures with regard to the CPM team at Local Authority C and the systems they had in place were hindering them from delivering services to their customers and failing to identify customer needs. Consultant 1 went onto to state:

"*There was a recognised need for change and NEC's lean approach came along at the right time and provided free training*."

Conclusion:

Reasons for LG organisations seeking to adopt lean are out of a need to improve their processes in accordance with Government objectives and to meet local and national targets. More pressure is placed on organisations in the current economic climate to meet customer demand whilst achieving shorter lead times and work within tighter budgets. The Comprehensive Spending Review (2010) reinforces the importance for LG to become more efficient as the report states LG funding will be reduced by 7.1% between 2011 and 2014.

2. How appropriate is the lean model, including its tools, techniques and process?

Model design

NEC delivers the same generic lean model within LG and manufacturing although the organisations can select between two different training options as part of the package. The options are the BIT programme, lasting twelve to sixteen weeks or the shorter three day Lean Foundation course (LF course). Although the delivery of both programmes is the same, the attraction is for LG organisations to select the BIT programme as it is marketed as cost-free due to it being part of the National Vocational Qualification (NVQ) level 2 package, whilst the LF course incurs a daily nominal fee per group.

The stages of the model are standard and delivered in the same way and both lean consultants reported each stage of the interventions performed well where each LG group was proactive and keen to adopt change. One lean consultant stated although he was satisfied with the delivery of the model on this occasion he was aware of the need to deliver and adapt the programme to suit the needs of LG departments in the future due them providing a variety of services. Both lean consultants agreed the organisations should be able to carry out further lean interventions without the need of an external change agent as the principle of the programme is to provide them with necessary lean skills and knowledge. They reported each LG organisation planned to carry on using lean in the future.

Conclusion:

Whilst NEC use a generic lean model in their delivery to LG, there appears to be a need to adapt the programme to suit the specific requirements of LG departments. This is due to LG organisations delivering a varied and vast range of services to the general public and a one-size fits all lean approach must be therefore adapted to address these complex needs. Some of these changes should include a range of lean tools and techniques chosen specific for the type of LG service or department. Although both lean consultants state each LG organisation should be able to carry out future lean activities without the need of an external change agent no additional support was provided in the way of training lean leaders within LG.

Diagnostic tool

A diagnostic tool known as a Productivity Needs Analysis (PNA) was discussed with a senior manager relating to each of the case studies although only two documents were completed. The PNA is a key part of NEC's lean model which is a business diagnostic tool derived from manufacturing and is used to measure the impact of any improvement activity within an organisation or department. Data relating to factors affecting productivity, cost or quality is obtained to identify the priority areas of lean implementation. It is used during the initial consultation stage between the lean consultant and senior management of any organisation seeking to improve productivity. The responsibility for the completion of the form lies with the senior manager of whose department is due to undergo NEC's intervention. None were completed in case studies one to seven although the document was completed in case studies eight and nine. Senior managers admitted to the lean consultants they found difficulty in completing the form due to the required data not being available or being too difficult to access. It is still possible to measure any impact of the intervention without the PNA because information can be obtained from participants during the SENA. One lean consultant stated he felt it was not necessary for the PNA to be completed in its current format and the document could be a lot simpler to complete, as it currently asks too many questions. He suggested rather than ask for statistical information it could alternatively ask a series of questions relating to why the process is being reviewed. He also suggested the new format could include:

**'***What am I looking at? What do I expect out of it? Why am I looking at it? Here's what could be measured***.'** (Consultant 1).

Although the PNA is not always completed it is seen by the lean consultants as being a relevant stage of the model because it provides measures for the project being targeted. One lean consultant stated on the relevance of the PNA during interventions:

**'**T*he key aspects to aid the success of the intervention include the PNA, the right team, right data ,right issues, right aims and objectives and the right amount of time to address the problem.'* (Consultant 2).

Conclusion:

The PNA diagnostic tool does not appear to be effective in its current format as only two case studies out of nine had completed the document. This was due to the type of data being either unobtainable or difficult to access. The PNA is designed to be used within manufacturing organisations where the type of data required for its completion is readily available. When used within LG the type of data required for its completion is irrelevant and leads to frustration when the form cannot be completed. This suggests a change in the diagnostic tool is required to meet the individual needs of the service providers.

Training

Although delivery of the model was structured in the same way, the content of the training delivered in case study nine differed to the first eight case studies. A three day LF course was delivered in case study nine where a twelve to sixteen BIT programme was delivered to the first eight case studies. Both lean consultants considered the training approaches to be appropriate for the needs of LG and were aimed towards the right level of staff although there was recognition by Consultant 1 that the Health and Safety module contained within BIT, as part of the NVQ requirement, was inappropriate. All case studies included attendance from a cross-section of staff ranging from departmental staff through to senior management.

Conclusion:

A standard training approach was delivered in each case study scenario but consideration was not made by NEC to reflect the range of service provisions found within LG. The BIT programme was standardised where the content of the tools and techniques within the course modules was pre-selected. No allowance could be made to adapt the course content in order to better suit the needs of LG.

Lean tools and techniques

Lean tools and techniques delivered in the BIT programme and LF course are illustrated in Table 4.3 which shows both programmes provide the same lean tools and techniques except Health and Safety listed in the BIT programme is replaced in the LF course by data analysis and measurement. The lean tools and

techniques are delivered by NEC as a standard package in the same way to LG as for manufacturing organisations.

Lean tools and techniques delivered in the BIT programme are pre-selected as part of the mandatory units where NEC does not have any choice of which elements are chosen. It is only possible however, to modify the order in which they are delivered. Health and Safety is often reported by staff attending the programme as being an irrelevant part of the programme because the organisations already deliver it as statutory training.

| BIT Programme (NVQ level 2) | LF Course |
|---|---|
| Process Mapping | Process Mapping |
| 7 wastes (Lean philosophy) | 7 wastes (Lean philosophy) |
| Continuous improvement / PDCA / kaizen process | Continuous improvement / PDCA / kaizen process |
| 5S (workplace management) | 5S (workplace management) |
| Standard operations | Standard operations |
| Problem solving | Problem solving |
| Visual management | Visual management |
| Health and safety | Data analysis and measurement |

**Table 4.3 Lean Tools and Techniques delivered by NEC.**

Consultant 1, who was responsible for delivering the BIT lean intervention across the first eight case studies, stated all lean tools and techniques apart from Health and Safety were appropriate for LG because:

'*It involves the people who are doing the job on a day to day basis and the programme meets the departmental and organisational requirements.'* (Consultant 1).

There were no other lean tools and techniques in his opinion that could be added to the programme for LG. NEC has an input in which of the elements are selected in the LF course which is considered by the lean consultant delivering this

programme to be more flexible than the BIT programme. This is because a wide range of lean tools and techniques can be selected by the lean consultant and training facilitator to suit the needs of the problem identified during the process mapping stage. Consultant 2 who was responsible for delivering the LF course explained:

'*The NVQ training contains core lean tools and techniques which are applicable in any environment where the foundation training alternatively allows the problem to dictate which tool is selected.*' (Consultant 2).

Because there is an element of flexibility in the LF course Consultant 2 stated lean tools and techniques are appropriate for the LG intervention, according to his feedback obtained from participants. He suggested policy deployment could be added as another lean technique which is not provided on the programme but could help LG achieve sustainability. Although policy deployment is not a lean tool or technique it is used within lean organisations as part of a cascading strategy to align the organisation into focusing on the same objectives.

Conclusion:

Lean tools and techniques are not contextualised for use in LG and are delivered as part of standard training packages in the same way as for manufacturing organisations. Both training programmes are very similar in their content of lean tools and techniques despite the difference of time taken to deliver each programme. Whilst the BIT programme is restricted in the content of tools and techniques being delivered, the LF course has the benefit of adapting its range to suit the needs of the department although no intention is indicated by NEC for these to be contextualised. Evidence of this is where NEC has recognised Health and Safety as being an inappropriate element contained within the BIT programme and therefore eliminated it from the LF course. Policy deployment is not present in either programme but is considered by Consultant 2 to be an effective method that could add benefit for LG in terms of sustainability.

3. What are the factors that may influence implementation success?

Process

Both lean consultants considered the lean model was aimed sufficiently towards each group and focused on identifying issues within the available time. The lean consultant delivering the BIT programme stated:

'*The lean model was aimed sufficiently towards each group and although the training is a standard format, everything revolved around what each particular group wanted to focus on.*' (Consultant 1).

The lean consultant delivering the LF course added:

'*The model was sufficiently aimed towards the group and the focus was shifted according to the needs of the team. Feedback on close of the intervention reflected the success of the training in terms of meeting their needs*.'(Consultant 2).

Conclusion:

Both lean consultants considered their lean model was appropriate in addressing the needs of each group although this is questionable. The BIT programme is standardised and does not take into account the individual needs of the LG department where a 'one size fits all' approach is delivered. In contrast, the approach within the LF course is adapted to suit the needs of the group.

Organisational Culture

The lean consultants consider organisational culture differs between LG and manufacturing organisations due to the nature of work and different processes being used where LG organisations find difficulty in visualising how they're performing. According to the lean consultant delivering the LF course similarities between the two sectors exist, however such as senior management alignment, commitment, and willingness to change. Despite these similarities the lean consultant stated from his experience of delivering lean to both sectors, staff in manufacturing organisations tend to be more forthright by verbalising if they have any problems with the lean training whilst staff in LG may remain quiet. There would, for example, be passive resistance from LG staff who may attend the

training but later refuse to fully co-operate with the new project and result in the project failing.

Conclusion:

Differences and similarities may exist within any organisation so the approach during each lean intervention must be adapted accordingly. A standardised approach must therefore be avoided from the point of initial contact by any external lean change agent when engaging with new clients. It may be beneficial for the external lean change agent to derive from the same LG organisational background in order to easily understand their requirements.

Sustainability

Both lean consultants were confident lean would continue in each LG organisation where the interventions were successful due to the good level of commitment from all staff. Adequate resources were available for carrying out the interventions although Consultant 1 stated staff attendance was usually an issue, where at the start of the course there may be good turnout but towards the end there was often a significant depletion. He suggested a reason for this is because the BIT programme is provided free of charge and is easier for managers to withdraw staff from the training sessions rather than if they had paid for it. There was good staff involvement across all interventions which were attended by departmental staff as well as senior management. Sufficient support was provided by senior managers for all staff attending the programme in terms of time to carry out the training.

Conclusion:

Despite both lean consultants reporting there was a good level of commitment from all staff during the lean interventions in terms of attendance and adequate time was set aside to carry out training, it appears costing issues relating to the NVQ may be of concern regarding lean's implementation success. Although the BIT programme was provided free of charge to LG attendance of the BIT modules was reported by Consultant 1 to fluctuate, which suggests some lack of commitment.

Barriers

No problems or barriers were reported by the lean consultants in relation to the performance of interventions carried out in the case studies. One lean consultant reported however that the biggest problem arises with delivering the BIT programme where there may be a fluctuation of staff attendance between each training session. The training groups are supposed to consist of a certain amount of staff in order for the sessions to work well and non-attendees create detrimental impact. The first problem occurs where staff do not gain evidence which is required for the NVQ and they have to catch up on course work that has been missed creating more assessor time. The second problem occurs where the project may suffer where instead of having perhaps eight members of staff carrying out the actions for the intervention, there may only be four or five, therefore creating a delay in the work being carried out. Feedback often received by the lean consultants indicates that the Health and Safety element for the BIT programme is irrelevant and any paperwork required for the NVQ often quells any enthusiasm created by the SENA activity. This was stated by the lean consultant responsible for delivering the BIT programme:

'*The SENA activities are popular but enthusiasm soon disappears once any paperwork necessary for the qualification is completed.'* (Consultant 1).

Conclusion:

Most emphasis and time is spent during the lean interventions by completing paperwork required for the NVQ and the Health and Safety element of BIT also appears unnecessary. There is inconsistency of LG staff attending the BIT programme probably due to other work commitments and the length of time required to complete the programme.

4. Have the intended outcomes been achieved?

Benefits

Benefits were achieved across all nine case studies although there were varying levels of impact made in each case. Improvements were made in quality, cost and performance which had impact on the organisation, department, productivity and customer. These examples were related by both lean consultants according to

Table 4.1 in reference to their post implementation summary reports. Consultant 2 reported that the biggest result from his lean intervention led to the case study group being able to change their way of thinking and identify their purpose which was to meet the demands of their internal customer. This led to a full-scale review of their system and the Lean philosophy was incorporated to help achieve their goals.

Conclusion:

Lean interventions enabled the case studies to achieve benefits across the three LG organisations. Positive results were made for both internal and the end customer and included the reduction of wasteful activity within each process. This enabled the LG departments to become more efficient in terms of reducing cost, increasing productivity and improving quality of services. Lean fulfilled the expectations of the LG organisations as the lean consultants reported they were attracted to the lean approach because there was a need for LG to identify customer demand and more effectively meet their needs.

### 4.3.2 Senior Managers

1. What are the policy drivers and expectations from using lean?

There was a general awareness of lean amongst senior managers before the interventions took place although there was no in-depth experience. Senior management teams were involved across all three LG organisations in the decision process to adopt lean and the main policy drivers for its introduction was the Gershon Report (2004) and the Comprehensive Spending Review (2007). All agreed the purpose of adopting lean was to improve services for customers whilst making financial savings and using lean would be part of a long-term plan. 78% of senior managers expected lean to bring about quick changes within their organisation and 22% stated their expectations of how quickly lean could bring about changes would depend on the complexity of the process being reviewed.

Conclusion:

Policy drivers were reported by senior managers to be the most significant in the LG organisations' transition towards lean; examples include the Gershon Report

(2004) and the Comprehensive Spending Review (2007). The main reasons for adopting lean were to make financial savings and improve customer services. There was a high expectation amongst senior managers that lean would bring about rapid improvements.

2. How appropriate is the lean model, including its tools, techniques and process?

Model design

All senior managers agreed information given at the beginning of the intervention accurately reflected the actual content and all had a positive opinion of lean following the programme. Everyone found the model easy to understand and use and comments were made about it being a 'common-sense' approach. When asked what improvements could be made to the model to make it relevant for departmental needs, 56% of senior managers replied the Health and Safety module should be omitted from the course. A reason given for this statement was that Health and Safety is already provided by the organisations as statutory training. Another common opinion of the intervention was completing paperwork required for the NVQ often got in the way of learning about lean.

Conclusion:

Although positive feedback was obtained about the lean model 56% of senior managers considered Health and Safety to be an irrelevant part of the programme as it is already provided as statutory training. Too much time spent completing paperwork for the NVQ was another negative factor that detracted senior managers from understanding lean.

Diagnostic tool

Out of a total of nine PNAs only two were completed and three of the senior managers stated they found the document difficult to understand and complete. Five senior managers who were interviewed had no knowledge of the PNA although it is accepted the document may have been discussed with a fellow colleague who was not available for interview. Reasons for not completing the document were no data was available for the completion of the form, the terminology did not lend itself to LG or the length of the form was too long. One

senior manager considered the PNA to be relevant although he suggested if it is to be used in the future then the form should be put into better context for LG:

'*It was difficult using' productivity' in LG terms and it is difficult as a service, to categorise a member of staff as being an item of productivity. The PNA is relevant but needs to be better explained and put more into context for LG.'* (Senior Manager, Case Study 5).

One senior manager who completed the document found the process to be the most difficult amongst the various stages of the model. He stated although data was available for him to complete the form he found difficulty in understanding its relevance. He considered process mapping to be more beneficial and appropriate as it allowed the group to easily identify areas that needed attention. He stated the PNA did not add any value and he could understand other managers being put off adopting lean when confronted by the document. He suggested if the PNA is to be retained then it should be more concise and request data relevant to the organisation. An alternative recommendation would be:

'*Instead of the PNA, there should be a short statement given by the head of the LG department at the beginning of the lean intervention to inform everyone what the main issue was that required attention.'* (Senior Manager, Case Study 8).

Conclusion:

The PNA in its current format is not appropriate as a diagnostic tool for LG. Only two out of nine PNA documents were completed due to the document being too lengthy, difficult to understand and data required for its completion being unavailable.

Training

Everyone agreed the use of an external change agent was effective although two senior managers reported there was some inconsistency in the use of the NVQ facilitators. This caused some distraction for the learning groups as new NVQ facilitators had to become familiar with the needs of the group which was time consuming. The lack of an on-site lean leader was not a problem amongst any of the groups. 44% of senior managers stated staff had been given sufficient skills and knowledge for any further lean training to be carried out in-house although

33% of respondents suggested that a combination of both in-house training and external change agent would be beneficial. Reasons for this suggestion included the complexity of an issue being reviewed, where external change agents could provide unbiased opinion and expertise.

Conclusion:

External change agents were effective for the LG departments seeking to understand lean as they either had very little or no previous knowledge of lean prior to NEC's guidance. Additional training to develop internal lean leaders within LG could benefit them towards becoming sustainable lean organisations.

Lean tools and techniques

Process mapping was unanimously the most useful lean technique where only one positive response was made for 5S, standardisation, visual management and understanding waste. 44% of senior managers reported all of the lean tools and techniques were beneficial although Health and Safety was found to be the least relevant. 56% of senior managers stated some of the lean techniques such as process mapping or 5S have been used within their department since completing the programme and a further 33% who had not yet adopted lean within their department believed there was a role for lean tools and techniques to be used in the future.

67% of senior managers had not received any experience of other improvement techniques so were unable to make any comparisons with lean although EFQM and PRINCE 2 were two improvement techniques that had been used previously. Lean was considered to be relevant, common-sense and easy to use within any department. All senior managers believed lean was relevant for the organisational and departmental needs and could meet customer's needs.

Conclusion:

All lean tools and techniques were considered by senior managers to be relevant for their organisations in meeting customer requirements. Process mapping was found to be the most useful technique whilst Health and Safety was the least beneficial. Lean was found to be a common-sense and easy to use approach

where some techniques were reported to have been adopted by departments following NEC's intervention.

3. What are the factors that may influence implementation success?

Process

Although 56% of senior managers considered the duration of the BIT programme to be sufficient, there was some suggestion that the course could be reduced if the gaps between each session were made shorter. The amount of paperwork required for the completion of the NVQ was considered to be problematic and got in the way of learning about lean. The effects of the BIT programme caused extra pressure being placed on work colleagues who did not attend the course and whose department may have already been short staffed. Staff attending the course were concerned about having to catch up on work on return to their department. These issues are summarised as follows:

'*Two days were wasted because of the paperwork that was involved for the NVQ component*.' (Senior Manager, Case Study 2).

'*The training session was enough although the gaps between each session were too long because there is a tendency for staff to lose momentum of what they have learned…The training programme did cause problems on staff resources within the planning department. Half the staff attended the programme and they were expected to catch up on work on their return whilst striving to meet the deadlines in accordance with Government legislation.* (Senior Manager, Case Study 3).

'*Extra pressure was put on departmental staff to carry out work in their colleague's absence during the training programme*.' (Senior Manager, Case Study 4).

'*The duration of the training programme is enough but it could be condensed into perhaps four or five days*.' (Senior Manager, Case Study 5).

'*The course could have been condensed and elements such as the Health and Safety could have been omitted. There were days when the course began late and finished early and the gaps between the training events were also too long*. (Senior Manager, Case Study 6).

'*The Health and Safety element should be removed which would allow more time to be spent on process mapping*.' (Senior Manager, Case Study 8).

Conclusion:

Feedback from respondents was varied and based on subjective opinion. The information revealed most problems with the BIT programme were due to time being wasted through completing paperwork for the NVQ and gaps between training sessions were too long. This poses a risk for staff to lose interest in lean which may reduce its impact and sustainability within the LG authority. The length of the BIT programme also created extra pressure for staff who had to catch up on their workload between training sessions.

Organisational Culture

All senior managers believe lean fits in with their organisational culture as there was an overwhelming reply that LG is already striving towards making efficiencies and improving customer satisfaction. When asked to describe who would gain the most benefit from lean this created a varying response. 67% of senior managers considered customers would receive the greatest benefit from lean and 44% of these respondents also went on to suggest staff would gain some benefit. Benefits for the organisation were also considered by 33% of the senior managers. All senior managers attended the entire lean intervention and supported staff by providing them with time to complete the programme. They informed departmental staff about the lean training and requested volunteers to attend. 78% of senior managers reported they received positive feedback from staff on completion of the course and observed improvements within the department.

Conclusion:

The response from LG senior managers was positive in terms of applying lean within their departments and they considered lean to be a contributing factor towards achieving organisational targets. All senior managers attended the lean interventions and encouraged staff to attend lean training.

Sustainability

Continuous improvement was already used as part of the LG's strategy so the transition of incorporating lean within their strategic plan would create no problem. All senior managers reported there was a commitment across the authority to incorporate lean within their strategy and departments had either started to use

lean tools and techniques or were planning to use them within the near future. The LG organisations were still planning to train staff in lean and 22% of senior managers believed staff already trained in lean would return to their department and be expected to share information with their colleagues. 33% of senior managers were aware that plans were being made to set up teams of volunteers willing to help spread their lean knowledge and expertise across the organisation. A further 33% of senior managers suggested their authority would benefit from training staff into becoming 'lean leaders' so that in-house training could be held.

Conclusion:

Good commitment was evident across each lean intervention and there were reports of plans for all departments to continue using lean tools and techniques in the future. Based upon feedback from LG senior managers the transition to integrate lean within LG should be positive as continuous improvement was already reported as being part of their organisational strategy. Senior managers stated there were plans for staff to return to their departments and train colleagues in lean techniques and volunteers were sought to train staff throughout the LG organisations. The practicality of this would be difficult to carry out as LG needs to affirm who would take overall responsibility for lean training. It is also impractical to expect staff that have recently attended a short training programme and have no long-term practical expertise in lean tools and techniques to train fellow colleagues. Although senior managers stated there was positive commitment towards using lean at departmental level it is difficult to predict whether it will actually be carried out in the future. It may be difficult to convince managers at executive level in LG to commit to lean long-term, especially if extra funding is required out of the training budget to train the remainder of its staff in lean tools techniques. The transition for any organisation to become lean takes a long time and requires full commitment from all levels of staff and shorter term benefits and commitments may over-ride the decision to adopt lean as part of the long-term strategy.

Barriers

There were no outstanding problems or concerns reported from senior managers regarding the lean interventions although there was some initial concern from

them at the start of the programme. Some senior managers were either suspicious about what the course was about or they were guarded. Minor concerns were raised about the content of the programme however, where Health and Safety was considered to be irrelevant as it was already provided by the organisations as statutory training. The amount of paperwork was problematic as it got in the way of learning about lean and too much emphasis was placed on the NVQ rather than learning about the subject matter. All senior managers believed there would be no issue with introducing lean into their departments although LG organisational culture was expressed as the most common barrier to its successful implementation. Some of these potential barriers were suggested as staff being reluctant to accept change and a lack of commitment and support from senior management. Insufficient time to break away from daily tasks to discuss lean issues was another potential barrier. Terminology used in the intervention was appropriate for LG and any terminology derived from manufacturing was sufficiently explained.

Conclusion:

More attention was given to administrative requirements for the NVQ which detracted the focus away from LG senior managers' understanding of lean. There were no actual barriers against implementing lean although senior managers expressed some potential issues relating to departmental operations management such as insufficient time to break away from daily tasks to discuss lean issues, insufficient support from senior management, staff attitude and commitment to accept change. These concerns should not be a problem providing effective management systems and leadership commitment are in place.

4. Have the intended outcomes been achieved?

Benefits

Senior managers were asked to explain what benefits had been achieved following the lean intervention. These are documented in the individual analysis (Appendix 3) although a summary of their accounts now follows:

Senior Manager, Case Study 1: *'The biggest change since the intervention is the change in mindset amongst staff. They were initially resistive to change and*

*closed to any suggestions but as the programme progressed they gradually became more open. The internal mail delivery system is speedier and efficiencies have been made in the sorting system of new post. This has brought about improvements for other departments, such as the planning department because deadlines have to be met and now targets are more achievable.'*

Senior Manager, Case Study 2: *'Most departments taking part in the lean interventions gained benefit although it is too early to see the real benefits. The workplace has become tidier and improvements have been made in the way suppliers are paid due to the payment process becoming more streamlined.'*

Senior Manager, Case Study 3: '*The intervention allowed staff to analyse and scrutinise their processes and understand where improvements can be made in terms of becoming more efficient. Changes within the department have been made which include the office becoming tidier and safer due to 5S being implemented. Stages in the checking of documents have become more streamlined where there was previously a lot of duplication. Changes have been made for the customer as a result of the intervention where they now receive a faster response to their planning applications.*'

Senior Manager, Case Study 4: The length of time spent to recruit new staff had reduced.

*'The personnel department now ensures all new staff undergo a smooth process from enquiring about a job vacancy through to the first day at work.'*

Senior Manager, Case Study 5: Benefits were achieved for the department, productivity and customers. Efficiencies in productivity were obtained by reducing processes in the CRM system which led to a more streamlined and speedier front-line service. Time was saved for front-line staff who were previously involved in duplicating administrative work. As a result of this, the end customer since received a prompt reply from Street Scene services in relation to their enquiries.

Senior Manager, Case Study 6: Productivity improvements for the pest control department were made possible by the group reducing waste from parts of their process such as time and mileage. The amount of duplication involving paperwork and double bookings had also reduced. Benefits for end customers were achieved through better use of I.T equipment where a new web-site was introduced to provide clear information about the pest control and canine welfare services. The telephone answering system was improved to provide more information about the

range of services the department could offer and left clear instructions for how customers could contact the service out of hours.

Senior Manager, Case Study 7: Benefits were achieved for the customer, department and organisation. A web-site was introduced to advertise the banqueting suite in order to attract more customers where they can go on-line and see how the banqueting suite can be arranged for various functions and discover the range of menus on offer. Customers can now book on on-line rather than by telephone if they wish. Good working relationships were established within the team and staff became enthusiastic to return to their departments and make their own improvements.

Senior Manager, Case Study 8: A faster turnaround in processing planning applications was achieved through changing the time mail arrived within the department. This has brought benefit for the customer where planning applications are being dealt with more quickly and customers are now being kept informed of their stage in the planning process. Changes in the organisation of the office led to an improvement in the way planners organise their work where it is tidier and more organised. This was brought about through 5S.

Senior Manager, Case Study 9: It was too soon following the lean intervention for the manager to report any significant improvement. Benefits for the customer were anticipated where the CPM department intended to respond to their needs whilst adopting a more supportive role. The department also became more efficient and tidy through the use of 5S.

Conclusion:

All senior managers reported their experience of lean was positive and they reported benefits had been achieved within the department, organisation and for the customer. Efficiency was improved by reducing waste from departmental procedures identified from the process mapping stage and the use of selected lean tools and techniques such as 5S.

4.3.3 Departmental Staff

1. What are the policy drivers and expectations from using lean?

There was no prior knowledge of lean amongst departmental staff before the interventions took place and 82% of respondents thought there was a need for change within their organisation before lean was introduced. This is reflected by the following comments which are obtained from the individual analysis (Appendix 3):

'*There was a need for change before the intervention because everyone was used to doing the same work for years and failed to question if it could be done any better*.' (Departmental Staff, Case Study 2).

*'The purpose of adopting lean was to speed up processes and provide a more efficient service.'*(Departmental Staff, Case Study 4).

*'The purpose of adopting lean was to improve the business and make processes more streamlined and efficient. Its ultimate aim was to improve services for the customer.'* (Departmental Staff, Case Study 5).

'*There was a need for change within the organisation and the timing is right for lean to be introduced due to the changing role of Corporate Performance Management*.' (Departmental Staff (a), Case Study 9).

'*There was a need for change within the department as the current process was too complicated and time consuming.'* (Departmental Staff (b), Case Study 9).

18% of the respondents did not agree there was a need for change; a participant in Case Study 1 thought the previous system was working more effectively; a participant working in the same organisation who took part in Case Study 6 replied in a similar vein and considered the Local Authority was already progressive. 64% of respondents expected lean to bring about quick changes within their organisation and 18% stated their expectations would depend on the complexity of the process being reviewed:

'*Some projects are more complex than others and may take longer to achieve*.' (Departmental Staff, Case Study 3).

Conclusion:

It was not expected for LG departmental staff to be aware of any policy drivers requiring change although they did recognise there was a need to improve

procedures. The main reasons for using lean, reported by departmental staff, were to speed up processes and improve services for customers. There was a high expectation amongst staff for lean to bring about quick improvements.

2. How appropriate is the lean model, including its tools, techniques and process?

Model design

All respondents believed lean was appropriate for their department and could be used to meet customer's needs. They agreed information given at the beginning of the intervention accurately reflected the actual content and everyone had a positive opinion of lean following the programme. 91% of respondents found the model easy to understand and use and comments were made about it being a 'common-sense' approach where it could be used to make improvements within their department in terms of productivity. When asked to explain their opinion about each stage of the intervention 55% stated Health and Safety should be omitted. A further 36% also thought too much time was spent completing paperwork required for the NVQ and another 18% thought too much time was spent learning about 5S. Respondents taking part in the LF course had a different experience compared to those taking part in the BIT programme:

'*Health and Safety, 5S and the form filling required for the NVQ were time consuming and unnecessary.'* (Departmental Staff, Case Study 1).

'*Health and Safety should be omitted because the organisation already provides it as statutory training*.' (Departmental Staff, Case Study 2).

*'More time could be spent on learning about lean issues if Health and Safety was omitted from the course. Too much time and emphasis were spent on 5S and completing paperwork required for the NVQ folder.'* (Departmental Staff, Case Study 3).

'…*the worst parts were Health and Safety and wasting a lot of time completing the paperwork required for the NVQ*.' (Departmental Staff, Case Study 4).

*'The 5S exercise and Health and Safety aspects were a waste of time and inappropriate.'* (Departmental Staff, Case Study 5).

'*The negative part of the intervention was it took up a lot of time from the working day*.' (Departmental Staff, Case Study 6).

'*The Health and Safety element had the least relevance for everyone as it is already provided by the organisation as statutory training*.' (Departmental Staff, Case Study 7).

'*Too much time was spent on 5S*.' (Departmental Staff (a), Case Study 8).

'*The worst part of the intervention was learning about Health and Safety.'* (Departmental Staff (b), Case Study 8).

'*The only negative part was that not everyone could attend the entire three day event.'* (Departmental Staff (a), Case Study 9).

'*…the premises used for the programme was cold and uncomfortable'* (Departmental Staff (b), Case Study 9).

Conclusion:

Positive feedback was obtained from departmental staff regarding the lean model, particularly in terms of how easy it was to understand and apply to their processes. Negative aspects of the lean model varied between both training programmes. Departmental staff who attended the BIT programme were unhappy with the amount of paperwork required for the NVQ and certain elements of the programme such as 5S and Health and Safety. No problems were reported with the content of the LF course however.

Diagnostic tool

A diagnostic tool was not discussed with departmental staff although process mapping was used as part of the SENA process where all departmental staff considered this as positive.

Conclusion:

It was only appropriate to discuss the diagnostic tool, known as the PNA, with senior management. Although process mapping was part of the SENA process and not delivered as a diagnostic tool all departmental staff considered this to be a positive feature of lean.

Training

27% of respondents stated they would have preferred to receive some information about lean prior to the programme in order to allay any pre-conceived anxiety. An

example of this is explained by a participant's experience from Case Study 8 who reported no information was given before the commencement of the training programme so she did not know what to expect. Because of the lack of information she also expected the course was going to be more intense and any issues arising from the intervention would be passed onto senior management for their attention which was not to be the case. Information was however provided at the beginning of the intervention in the form of module workbooks in the case of the BIT programme and through presentation by the lean consultant or NVQ facilitator in both training formats. This has been confirmed by direct observation by the writer during previous interventions.

Everyone apart from one respondent agreed the use of an external change agent was effective for their organisation. The reason for this negative opinion was expressed as follows:

'There was n*o consistency because a different NVQ facilitator was used throughout the programme*.' (Departmental Staff, Case Study 1).

Two other departmental staff also reported there was some inconsistency in the use of NVQ facilitators which caused some distraction for the learning groups although this did not affect their positive opinion of the change agent. The lack of an on-site lean leader was not a problem for any of the groups. 82% of respondents considered they had gained sufficient skills and knowledge for any further lean training to be carried out in-house, where 36% stated any further lean training would be more appropriately led by an external change agent due to their expertise.

External change agents were effective for the LG departments seeking to understand lean as they either had very little or no previous knowledge of lean prior to NEC's guidance. Additional training to develop internal lean leaders within LG could benefit them towards becoming sustainable lean organisations.

Conclusion:

Most respondents reported they felt equipped to carry out lean activities in the future although the provision of information prior to lean training programme may be beneficial in allaying any fears and misconceived ideas. There was positive response in the use of an external change agent due to most respondents having very little previous knowledge of lean. The lack of an on-site lean leader caused no concern although inconsistency in the use of NVQ facilitators was reported by those attending the BIT programme to be a distraction.

Lean tools and techniques

Process mapping was considered to be the most useful lean technique where 27% of respondents considered understanding waste to be beneficial followed by 5S at 9%. 73% of respondents considered Health and Safety to be the most irrelevant lean technique followed by 5S at 64% although reference to other lean tools and techniques were not mentioned by the respondents. All agreed lean tools and techniques could have a positive impact on their workload in the future if they had not already been implemented within the department.

Conclusion:

All respondents considered lean tools and techniques as having a positive impact on their workload with process mapping bringing the most benefit. Health and Safety was considered as being the most irrelevant however as it is already provided in LG as statutory training. There is contradiction in the opinion of 5S where 9% of respondents considered it to be the third most useful lean tool and technique whilst 64% viewed it to be irrelevant for their departmental needs. One may conclude from these statistics that 5S is not considered by the respondent group as being an effective lean tool and technique.

3. What are the factors that may influence implementation success?

Process

All respondents felt part of the decision making process and their opinions were valued throughout the intervention where comments were made about each group being focused on achieving the same outcome and all staff contributed equally. All staff confirmed the content of the programme was aimed at the right level where

they understood the purpose of lean and could anticipate it making a positive influence in their workplace. 56% of respondents who attended the BIT programme stated the duration was sufficient although 36% considered it to be too long. The most common reasons for these comments were gaps between sessions were too long and there were days when sessions began late and finished early:

'*It was a common occurrence where training would start late and in the morning and finish early in the afternoon. The gaps between each training session were also too long*.' (Departmental Staff, Case Study 1).

'*The duration of the training programme was too long where some sessions started late and finished early and the breaks were too long*.' (Departmental Staff, Case Study 3).

'*The duration of the training was enough although the gaps between the sessions were too long*.' (Departmental Staff, Case Study 5).

'*The gaps between each session were too long*.' (Departmental Staff (a), Case Study 8).

Not all respondents shared the same views about the lengthy gaps in-between training sessions involved in the BIT programme. Some respondents actually saw this factor as advantageous:

'*The gaps between each session were long enough for the group to carry out their tasks identified from the intervention*.' (Departmental Staff, Case Study 6).

'*The gaps between each session were long enough to carry out tasks required for the qualification*.' (Departmental Staff, Case Study 7).

<u>Conclusion:</u>

All respondents understood the concept of using lean and were confident it could be used at departmental level in the future. Most problems occurred within the BIT programme where too much time was wasted through completing paperwork for the NVQ and gaps in-between training sessions were too long. This poses a risk for staff to lose interest in lean which may reduce its impact and sustainability within the LG organisation. The length of the BIT programme may also create extra pressure for staff having to catch up on their workload between training sessions.

Organisational Culture

All departmental staff were made aware of the lean training by their line manager where volunteers were requested to attend and only 18% of respondents confirmed they felt apprehensive and reluctant beforehand. Reasons given for any reluctance were staff did not know what to expect from the course or they did not feel the training was relevant to their role. All departmental staff confirmed there was good support from senior managers who provided them with sufficient time to complete the course. Following the lean training all respondents understood the purpose of introducing lean into the organisation to be about improving efficiency and meeting customer demand, where two members of staff quoted the Gershon Report (2004) as being the main driver for change. Only one respondent considered saving money to be the main purpose of adopting lean. 73% of departmental staff confirmed lean had already made a positive impact upon morale and within the workplace.

Conclusion:

There was positive response from departmental staff towards adopting lean within their LG organisations and all respondents confirmed good support was provided by management in terms of encouragement and sufficient time to attend lean training sessions. The lean interventions made a positive impact towards improving morale and all respondents had a clear understanding of the purpose of adopting lean.

Sustainability

All respondents confirmed they were confident about lean being continued within their department as senior management were keen to adopt change. 73% of departmental staff either stated lean had already made a difference to their workload or believed it could make a positive difference in the future. Some respondents commented that it was too soon after the lean intervention to make any impact.

Conclusion:

Respondents were confident that lean would be used at departmental level in the future and they were aware of plans to incorporate it at senior management level.

Their perception of lean was positive and there was a belief that it could continue to make improvements. Although there was positive response about the future role of lean within LG it is questionable whether who would take overall responsibility to carry out training and ensure its use at strategic and operational level.

Barriers

When asked if the intervention had caused any inconvenience, 27% confirmed that it had, due to the length of time spent away from their work. All respondents believed there would be no problem with introducing lean into their workplace and were positive about its introduction. Potential barriers for lean's success within the organisation were suggested such as a lack of commitment amongst all levels of staff and insufficient time to review processes. Concerns were expressed about too much time and emphasis being placed on paperwork required for the NVQ. Other issues were described as the BIT programme taking too long to complete and external change agents having insufficient knowledge of LG terminology and processes. 64% of respondents stated the NVQ facilitators used terminology and examples from manufacturing which was distracting, although they confirmed some examples were put into a service industry context when challenged.

Conclusion:

Although respondents had previously stated enough support and time was provided to attend the lean interventions some concern was raised that insufficient time and commitment could be a potential barrier for implementing lean in the future. Main concerns were not about the actual lean interventions but about the length of time to complete the BIT programme and too much attention being focused on administrative requirements for the NVQ. NVQ facilitators delivering the NVQ modules gained their knowledge of lean from manufacturing environments and therefore had no experience of processes or terminology within LG.

4. Have the intended outcomes been achieved?

Benefits

All departmental staff reported their experience of lean was positive and all reported benefits had been obtained within the department, organisation and for

the customer. When asked what changes had occurred within the workplace 91% of respondents stated improvements had been made for the customer with 82% of them going to report benefits had also been achieved for the department. 64% of the respondents went onto suggest improvements in productivity had been achieved and a further 55% of them considered benefits for the organisation had been made. All respondents could relate to positive aspects of the intervention where comments were made about how well the programme was delivered and it allowed staff to think differently in terms of making improvements within their work. All staff were encouraged to actively participate during the programme and this led to better communication and improved working relationships between departments.

Conclusion:

All departmental staff reported their experience of lean was positive where the greatest perceived benefit was for the customer and the department although improvements were considered to have been made in terms of production and for the organisation. Added benefits from the lean interventions were reported by respondents to have improved communication and inter-departmental relationships.

### 4.4 Evaluation

An evaluation of the findings obtained from the cross case analysis, is illustrated in Table 4.4. This aims to answer the research question 'Is lean transferable into LG?' and to evaluate the lean model adopted by the LG departments in the case study research.

| Respondent Group …… Question | Lean Consultants | Senior Managers | Departmental Staff |
|---|---|---|---|
| **1. What are the policy drivers and expectations from using lean?** | Improve processes in accordance with Government objectives and meet local and national targets. More pressure is placed on LG to meet customer demand whilst achieving shorter lead times and work within tighter budgets. | The Gershon Report (2004) and the Comprehensive Spending Review (2007) were reported as being the most significant policy drivers to require change. Financial savings and improving customer services were other motivators for change. Senior managers expected lean to bring about rapid improvements. | It was not expected for LG departmental staff to be aware of any policy drivers requiring change although they did recognise there was a need to improve procedures. The main reasons for using lean were considered to speed up processes and improve services for customers. There was a high expectation amongst staff for lean to bring about quick improvements. |
| **2. How appropriate is the lean model, including its tools, techniques and process?**<br>**(a) model design**<br>**(b) diagnostic**<br>**(c) training**<br>**(d) lean tools and techniques** | **(a)** The model needs to be adapted to better suit the needs of LG. Additional support to train internal lean leaders required.<br>**(b)** Diagnostic tool needs adapting to meet the needs of the LG service providers.<br>**(c)** A standardised training programme is delivered but there is no consideration for it to reflect the range of service provisions used within LG organisations.<br>**(d)** BIT programme is restricted in the amount and range of tools and | **(a)** Positive feedback was obtained about the lean model but 56% of senior managers considered Health and Safety to be an irrelevant part of the programme as it is already provided as statutory training. Too much time spent completing paperwork for the NVQ was another negative factor that detracted senior managers from understanding lean.<br>**(b)** Only two out of nine PNA documents were completed due to the document being too lengthy, difficult to understand and data required for its completion being unavailable.<br>**(c)** External change agents were effective for the PS organisations seeking to understand lean as they either had very little or no previous knowledge of lean prior to NEC's guidance. Additional training to develop internal lean leaders were suggested in order to help the LG organisations become more sustainable. | **(a)** Positive feedback was obtained regarding the lean model, particularly in terms of how easy it was to understand and apply to their processes. Negative aspects of the lean model varied between both training programmes. Departmental staff who attended the BIT programme were unhappy with the amount of paperwork required for the NVQ and certain elements of the programme such as 5S and Health and Safety. No problems were reported with the content of the LF course however.<br>**(b)** Although process mapping was part of the SENA process and not delivered as a diagnostic tool all departmental staff considered this to be a positive feature of lean.<br>**(c)** Most respondents reported they felt equipped to carry out lean activities in the future although the provision of information prior to lean training programme may be |

| | | | |
|---|---|---|---|
| **2. How appropriate is the lean model, including its tools, techniques and process?**<br>**(a) model design**<br>**(b) diagnostic**<br>**(c) training**<br>**(d) lean tools and techniques** | techniques being delivered. Health and Safety element is inappropriate. Policy deployment is considered to be beneficial (Consultant 2). | **(d)** 44% of senior managers reported all of the lean tools and techniques were beneficial whilst process mapping was found to be the most useful and Health and Safety was the least relevant. One positive response was made for 5S, standardisation, visual management and understanding waste. Lean was found to be a common-sense and easy to use approach where 56% of senior managers reported some techniques such as process mapping and 5S had been adopted by departments following NEC's intervention. 33% who had not yet adopted lean within their department believed there was a role for lean tools and techniques to be used in the future. | beneficial in allaying any fears and misconceived ideas. There was positive response in the use of an external change agent due to most respondents having very little previous knowledge of lean. The lack of an on-site lean leader caused no concern although inconsistency in the use of NVQ facilitators was reported by those attending the BIT programme to be a distraction.<br>**(d)** Process mapping was considered to be the most useful lean tool and technique by all staff. 27% considered waste to be beneficial followed by 5S at 9%. Contradiction exists where 64% of respondents considered 5S to be irrelevant. 73% considered Health and Safety to be the most irrelevant. Reference to other tools and techniques was not mentioned by the respondents. All respondents understood the concept of using lean and were confident it could be used at departmental level in the future. |

| Respondent Group …… Question | Lean Consultants | Senior Managers | Departmental Staff |
|---|---|---|---|
| **3. What are the factors that may influence implementation success?**<br>**(a) process**<br>**(b) organisational culture**<br>**(c) sustainability**<br>**(d) barriers** | **(a)** Both lean consultants considered the process was appropriate although NEC use a standardised approach which does not adapt to the needs of LG.<br>**(b)** Similarities exist between manufacturing and LG organisations such as senior management alignment, commitment and willingness to change. Passive resistance from staff occurs in LG which may result in any new project failing. It may be beneficial for the external lean change agent to derive from the same LG background in order to easily understand their requirements.<br>**(c)** A good level of commitment was reported in terms of staff attendance and adequate time set aside to carry out training. Costing implications of the BIT programme caused concerns in terms of staff | **(a)** 56% of respondents considered the duration of the training programme to be sufficient but there was some suggestion that the course could be reduced if the gaps between each session were made shorter. Most problems with the BIT programme were due to time being wasted through completing paperwork for the NVQ and gaps between training sessions were too long. The length of the BIT programme created extra pressure for staff who had to catch up on their workload between training sessions.<br>**(b)** The response was positive in terms of applying lean within the LG departments and lean was considered to be a contributing factor towards achieving organisational targets. 67% of senior managers considered customers would receive the greatest benefit from lean and 44% of them suggested staff would gain some benefit. All senior managers attended the entire lean intervention and supported staff by providing them with time to complete the course. 78% of senior managers reported they received positive feedback from staff on completion of the course and observed improvements within the department.<br>**(c)** All senior managers reported there was a commitment across the organisation to incorporate lean within their strategy and departments had either started to use lean | **(a)** All respondents understood the concept of using lean and were confident it could be used at departmental level in the future. Most problems occurred within the BIT programme where too much time was wasted through completing paperwork for the NVQ and gaps in-between training sessions were too long. The length of the BIT programme may also create extra pressure for staff having to catch up on their workload between training sessions.<br>**(b)** There was positive response from departmental staff towards adopting lean within their PS organisations and all respondents confirmed good support was provided by management in terms of encouragement and sufficient time to attend lean training sessions. Following the lean training all respondents understood the purpose of introducing lean into the organisation to be about improving efficiency and meeting customer demand. One respondent considered saving money to be the main purpose of adopting lean. 73% of departmental staff confirmed lean had already made a positive impact upon morale and within the workplace.<br>**(c)** All respondents confirmed they were confident about lean being continued within their department as senior management were keen to adopt change. |

| Respondent Group . …… Question | Lean Consultants | Senior Managers | Departmental Staff |
|---|---|---|---|
| | commitment. | tools and techniques or were planning to use them within the near future. | |
| **3. What are the factors that may influence implementation success?**<br>**(a) process**<br>**(b) organisational culture**<br>**(c) sustainability**<br>**(d) barriers** | **(d)** Most emphasis is placed on completing paperwork required for the NVQ. Health and Safety element is unnecessary. Inconsistency in staff attendance of the BIT programme due to work commitments and length of time to complete the programme. | The LG organisations were still planning to train staff in lean and 22% of senior managers believed staff already trained in lean would return to their department and be expected to share information with their colleagues. 33% of senior managers were aware that plans were being made to set up teams of volunteers willing to help spread their lean knowledge and expertise across the organisation. A further 33% of senior managers suggested their organisation would benefit from training staff into becoming 'lean leaders' so that in-house training could be held.<br>**(d)** Senior managers expressed some potential issues relating to barriers to lean implementation such as insufficient time to break away from daily tasks to discuss lean issues, insufficient support from senior management, staff attitude and commitment to accept change. More attention was given to administrative requirements for the NVQ which detracted the focus away from LG senior managers' understanding of lean. | 73% of departmental staff either stated lean had already made a difference to their workload or believed it could make a positive difference in the future.<br>**(d)** Although respondents had previously stated enough support and time was provided to attend the lean interventions some concern was raised that insufficient time and commitment could be a potential barrier for implementing lean in the future. Main concerns were not about the actual lean interventions but about the length of time to complete the BIT programme and too much attention being focussed on administrative requirements for the NVQ. NVQ facilitators delivering the NVQ modules gained their knowledge of lean from manufacturing environments and therefore had no experience of processes or terminology within LG organisations. |

| Respondent Group …… Question | Lean Consultants | Senior Managers | Departmental Staff |
|---|---|---|---|
| **4. Have the intended outcomes been achieved?** | Lean interventions enabled the case studies to achieve benefits across the three LG organisations. Positive results were made for internal and end customers. This enabled the LG departments to become more efficient regarding reducing cost, increasing productivity and quality of services. Lean met the expectations of LG departments where the lean consultants reported they were attracted to the lean approach as there was a need for them to identify customer demand and more effectively meet their needs. | All lean tools and techniques were considered by senior managers to be relevant for their organisations in meeting customer requirements. Lean was found to be a common-sense and easy to use approach where some techniques were reported to have been adopted by departments following NEC's intervention. | All departmental staff reported their experience of lean was positive where the greatest perceived benefit was for the customer and the department although improvements were considered to have been made in terms of production and for the organisation. Added benefits from the lean interventions were reported by respondents to have improved communication and inter-departmental relationships. All respondents could relate to positive aspects of the lean intervention as it allowed staff to think differently in terms of making improvements within their workplace. |

**Table 4.4 Cross Case Analysis Evaluation**
*Source: Author*
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### 4.4.1 Answering the Research Question

Analysis of data obtained from the semi-structured interviews relating to the case studies indicate that lean is transferable into LG although there are caveats and limitations to its implementation as follows:

#### Policy Drivers and Expectations

Lean appears to address the requirements of the LG agenda which is governed by policy drivers such as the Gershon Report (2004) and Comprehensive Spending Review (2007). Meeting customer demand by improving services was quoted as a factor for change by all three respondent groups and expectations from departmental staff were for processes to be quickened whilst senior managers anticipated financial savings may be obtained. Lean would therefore be appropriate for meeting the LG requirements for change as it focuses on the end customer by eliminating unnecessary waste within processes. A caveat exists however regarding the high expectation by all LG staff for lean to bring about rapid improvements. If lean is adopted by LG they must be made aware of its slow transitional process towards creating a lean organisation as revealed in the academic literature. If this is ignored then LG may run the risk of staff becoming impatient and losing interest in future lean events.

#### Benefits

All case studies demonstrated benefits can be achieved for customers, productivity, department and the organisation from the use of a lean approach. Departmental staff reported additional benefits were achieved such as improved communication and inter-departmental working relationships. The interventions focused on short-term achievable goals and therefore gained good support from both staff respondent groups. A caveat exists however as the process to adopt lean throughout any organisation is reported by academic literature to take a long time to establish and is therefore seen as a long-term strategy. If this fact is ignored by those LG organisations seeking to achieve long-term benefits then lean may be at risk of failure.

Caveats and barriers to implementation

Evidence obtained from all respondent groups revealed the most significant barrier to implementing lean within LG was not concerning the actual lean interventions but about the length of time to complete the BIT programme due to too much attention being placed on administration required for the NVQ. Senior managers stated it detracted their focus away from understanding the Lean philosophy. Consultant 1 reported there was some inconsistency in staff attending the BIT programme probably due to other work commitments and the length of time required to complete the programme. Another factor may be costing implications with the BIT programme, where staff attendance may have been consistent if the LG organisations paid for programme rather than receiving it free of charge. Comparatively, no attendance issues were reported in the LF course where it was significantly shorter than the BIT programme but had cost implications for LG.

Although there were no reported concerns regarding the lean interventions some potential barriers within LG were suggested by senior managers and departmental staff. Both of the respondent groups suggested insufficient time to break away from daily tasks to discuss lean issues and a lack of commitment for change may be obstructive. Despite these comments both respondent groups had shown a good level of commitment towards the lean interventions and adequate support was provided by senior management across each LG organisation. These concerns are not unique to LG but exist in all organisations. Providing effective management systems and leadership commitment are in place then these concerns would be unjustified.

Some concern was expressed from departmental staff who reported they were aware of the NVQ facilitators and lean consultants having no knowledge or experience of LG processes. Their background and knowledge of lean had been gained from manufacturing organisations which was evident from some of the terminology being used. If lean is to be implemented by external change agents in the future then it would be more appropriate for them to have experience of the same organisational background.

### 4.4.2 Evaluation of the Model

Analysis of data from the semi-structured interviews has revealed there are issues relating to the lean model used in the research where the main issues are:

- Model: design and process
- Diagnostic tool
- Training issues
- Selection of lean tools and techniques
- Sustainability

#### Model: design and process

Positive feedback was provided by senior managers and departmental staff regarding the lean model where the latter respondent group considered it to be easy to understand and apply. Negative aspects were reported by respondents using the BIT programme however, where too much time and emphasis were placed on completing paperwork required for the NVQ, which was considered to detract away from the focus of the programme. The Health and Safety module was reported by the two respondent groups engaged in the BIT programme to be unnecessary as it is already provided by LG as part of statutory training. NEC has recognised this aspect and it is not delivered in the LF course.

NEC delivers a generic lean model to LG but the training programme must be adapted to address the vast amount of services that they provide. The current model derives from manufacturing based organisations whose processes do not match those provided by LG. LG provides multi-focused services to the general public and a one-size fits all lean approach must be adapted to address these complex needs. The interventions in the case study analyses tended to focus on administrative rather than operational processes where potential benefits were obtained rather than actual improvements. Therefore, LG could be at risk of failure in their approach to lean if they do not become driven by customer demand which is the basis for adopting lean. No additional support was provided by NEC to train an internal lean leader which suggests any attempt by these LG organisations to use lean in the future may run into difficulty unless an external lean change with knowledge in LG services is used.

Gaps in-between each training event in the BIT programme were reported to be too long and therefore needed to be reduced in order to maintain the learning group's momentum of interest. This also placed extra unnecessary pressure for staff who had to catch up on their workload in-between sessions although no problems were identified with the LF course however.

Diagnostic tool

Only two out of nine PNA documents were completed from each of the case studies, representing 22%. Senior managers who had knowledge of the document or completed it found the process to be difficult and reported terminology to be irrelevant for LG or the length of the document was too long. The PNA does not provide any value in its current format and improvements were obtained without its completion across seven case studies where process mapping was used in its place during the SENA stage. The PNA is designed for use in manufacturing organisations where the terminology and type of questions relate to their type of processes where input and output measurement is clearly defined. A problem arises when the same document is used in public service organisations because processes are calculated differently to those in the manufacturing industry. Public service providers have both tangible and intangible inputs and outputs where customers are often present during the process. This issue is made more complex for LG as its departments provide a vast range of services for the general public where the customer may not always be present during the process. A consequence of this suggests a standardised diagnostic tool cannot be used in LG due to the vast variation of service provision. If the document is to be continued by NEC then this needs changing to reflect the individual needs of LG departments. This will be explored further in the 'towards a new framework' chapter.

Training

Although NEC delivers a standard model for LG, they provide two alternative training programmes following the SENA stage. Training programmes include BIT where candidates work towards obtaining an NVQ level 2 certificate and a three day LF course. No consideration is made however by NEC in both training programmes to reflect the range of service provisions within LG therefore an individualised package of lean tools and techniques should be provided specific to

the departments needs. Once lean consultants have completed the interventions LG departments are left without support or guidance from them to continue with their transition into carrying out further lean activities. Additional training to develop internal lean leaders should be included if lean is to succeed long-term in LG.

Departmental staff reported their preference of receiving information prior to commencement of the training programme in order to allay any fears about lean although since the training they felt confident in carrying out lean activities in the future. External change agents, otherwise known as lean consultants, were considered by both respondent groups as being effective for LG as there was no prior knowledge of lean before the interventions. A lack of the external change agents' presence throughout the remainder of the lean training was considered not to be a problem as this was carried out by the NVQ facilitators. Additional training was suggested by the LG senior managers to develop internal lean leaders as there was insufficient knowledge about lean in LG. The extra training would enable the organisations to become more sustainable and less reliant on external lean consultants whose knowledge is more familiar with manufacturing processes rather than services.

Inconsistency in the use of the NVQ facilitator was reported by departmental staff to be a distraction because time was wasted for the new NVQ facilitator to become acquainted with the group and intervention. These issues, if left unaddressed, lead to a risk of participants losing interest in lean which may lead to its failure.

Lean tools and techniques

Both senior management and departmental staff respondent groups considered lean tools and techniques to be easy to use and understand. Lean tools and techniques are not contextualised for use in LG and are delivered as part of standard training packages in the same way as for manufacturing organisations. Process mapping was found to be the most useful technique although Health and Safety was the least beneficial. The case study analysis revealed process mapping was the only lean tool and technique to receive positive feedback from all respondents in helping them identify and eliminate waste from their procedures for the benefit of the end customer. NEC has recognised the Health and Safety

module within the BIT programme is irrelevant and have therefore eliminated it from the LF course. This is because LG organisations already provide Health and Safety as a statutory training requirement. Both lean consultants considered the range of lean tools and techniques to be appropriate for the need of LG organisations although policy deployment, otherwise known as hoshin kanri, was suggested to be an additional system that could add benefit by aligning the organisation's strategy and obtaining sustainability. Policy deployment is not identified as a lean tool and technique but is used as a management process that aligns an organisation's activities with its strategic objectives.

The BIT programme does not allow for any flexibility of other lean tools and techniques being selected other than the ones dictated by the mandatory units. The LF course is also currently limited in the range of lean tools and techniques although they are selected according to the needs revealed from process mapping. Because there are no statutory restrictions in the LF course, it is possible for NEC to review their selection of lean tools and techniques in this programme. The range of lean tools and techniques used within NEC's lean model appears limited and care must be taken to select appropriate lean tools and techniques according to what is identified during the process mapping stage rather than delivering a standardised approach. The range of lean tools and techniques is limited and not contextualised for LG because they are designed for use within manufacturing processes where the end product is tangible. Services across LG are varied and intangible compared to manufacturing organisations so there is a need to develop a selection of lean tools and techniques relevant to their environment and type of service provision.

A conclusion of the case study analysis suggests process mapping was the only lean tool and technique to be consistently used by each department to help improve their processes. Although a range of other lean tools and techniques were taught as part of the training packages they were not contextualised for use in each improvement process. This suggests consideration should be made to contextualise lean tools and techniques specific to each LG department. A wider range of tools and techniques could then be taught to the organisation's internal lean leaders who would deliver training in the future.

Sustainability and Organisational Culture

Reports from each respondent group confirmed a positive attitude was evident throughout the lean interventions in terms of attendance and sufficient time being set aside to carry out training sessions. The only concern was in relation to the BIT programme where Consultant 1 reported attendance fluctuated in some of the training sessions. Attendance may have been consistent perhaps if the LG organisation had paid for the BIT programme rather than receiving it free of charge. Other possibilities for the inconsistency of attendance may be due to the BIT programme taking a long time to complete and more important perceived work commitments. In contrast, no attendance problems were reported for the LF course.

Both LG senior management and departmental staff respondent groups believed lean could make a positive impact within their organisations and there were plans for some departments to continue using lean tools and techniques in the future although there were no plans as to who was going to lead the lean interventions. It is impractical to expect staff that have recently attended a short training programme and have no long-term practical expertise in lean tools and techniques to train fellow colleagues. It is also difficult to establish who will become responsible within the LG organisation to take charge of ensuring the lean transition is maintained and difficultly would arise for them to continue using lean in the long term.

## 4.5 Summary

The chapter has revealed lean is transferable into LG but there are changes required to ensure its sustainability and implementation. The main issues that are required to ensure the successful transferability of lean into LG which will be discussed in chapter six are:

- Leadership

Internal lean leaders are required to help LG become independent from the need of external change agents who may not be familiar with their processes and organisational culture. The background of external change agents, including both

lean consultants and NVQ facilitators, should also derive from the same organisations for those they are helping to implement change.

- Training

The BIT programme is not a sustainable business model due to external funding requirements and inflexibility of the programme. The length of time required for completion of the programme ranges from 12 to 16 weeks in comparison to three days for the LF course which costs £3000 per group based on NEC's consultancy fees. The real cost incurred for LG organisations using the BIT programme is the length of time required by staff to attend the programme spent away from their daily tasks and the extra staffing resources being needed in their absence. Recommendations for the cost of delivering a new lean framework should be based upon the LG organisation's needs. The daily fees of the lean consultant per group are similar to the LF course, although the length of time required by the LG organisations may fluctuate according to their training needs.

Training LG staff in the Lean philosophy and its associated tools and techniques would increase the likelihood of lean becoming more sustainable in LG and reduce cost implications incurred from external change agents. Training should be consistent and specific to the type of service being provided by LG and incorporate a relevant selection of lean tools and techniques suited to the departmental service process. Gaps between training sessions should be sufficiently spread according to the participants training needs and adjusted according to how quickly their knowledge is achieved.

- Diagnostic tool

The PNA is currently not fit for purpose and should be modified and put into better context for LG. It should be concise in length, include appropriate terminology and use relevant questions to measure issues of productivity. As the diagnostic tool is aimed for use at senior management level it should be incorporated as part of their strategic plan to identify waste in their departmental processes and help towards complying with meeting organisational objectives.

- Tools and Techniques

At present the lean tools and techniques are linked to the BIT programme and are the same in the LF course although there is scope to make changes in the latter. Changes in the range of tools and techniques are recommended to ensure the transferability of lean into LG and will be discussed in chapter six. Process mapping should be retained as the analysis has proven that it is the most effective lean tool and technique which helps organisations identify waste from their processes and meet the needs of their customer whilst reducing cost and improving quality and productivity. Lean tools and techniques are manufacturing derived and need to be contextualised during training for use in LG. In order for LG not to be over-whelmed by the amount tools and techniques made available to them and risk lean not being adopted for its long-term use the range should be carefully selected.

- Sustainability

All staff believed lean would be adopted long-term and all senior managers confirmed there was a commitment to incorporate it within their strategy where departments had either begun using lean tools and techniques or were planning to use them in the near future. Two questions arising from this issue were (i) who will lead the transition for the LG organisations? and (ii) do they have sufficient lean knowledge? Once lean consultants have completed the interventions the LG organisations are left without support or guidance from them to continue with their transition into carrying out further lean activities. This makes it difficult for LG organisations to continue using lean and become sustainable. It is also difficult to establish who will become responsible within LG to take charge of ensuring the lean transition is maintained. Training internal lean leaders is therefore a main component to ensure lean's sustainability in LG where this issue has already been identified within the model design.

# Chapter Five
# Critical Analysis

## 5.1 Introduction

The chapter provides a critical analysis of the research methodology. A range of key questions have been used to test the soundness of the methodology, and the validity of the results and conclusions.

## 5.2 Methodology

The research focus from the commencement of the study included both health care and Local Government (LG) although unforeseen circumstances affecting the delivery of NEC's lean training programme caused the focus to concentrate only on LG. This did not affect the selection of available case studies however as the issues affecting NEC occurred prior to the commencement of data collection.

- Were the case studies representative of LG?

The case studies were considered to be representative of the LG sector as a cross section of LG departments from more than one LG organisation seeking NEC's guidance was accessed. Three types of respondent groups involved in the interventions across nine different departments in three different LG organisations focusing on different aspects of business were accessed. Due to the nature and focus of the interventions they were deemed to be a sufficient amount within the time available to conduct the research made available by opportunity and availability.

- Were the right questions asked?

It is believed the right questions were asked as extensive question schedules were developed for each respondent group which covered, in detail, the key areas to be investigated (Appendix 2). The semi-structured interviews also allowed additional questions to be asked to provide more clarity when required. It is believed data collected allowed the research questions to be fully addressed such as issues of sustainability, appropriateness of the model and barriers to implementation.

The issue of sustainability was the most difficult question to answer as the literature indicates that the transition of lean into LG is a recent development, where most work has been carried out within health care. Information obtained from respondents in the case study analysis was relevant and related to their experience of the lean interventions but their opinion was also sought into lean's future role within LG. Seeking opinion was considered important, and contributed towards both aims of the research. It is however difficult to anticipate outcomes based on opinion due to interference from external contributing factors such as policy and procedures and changes in the way LG is controlled by the electorate and Central Government. However, structured changes to the model to aid sustainability are suggested in the next chapter.

It is not felt anything substantial or important was omitted from the study. The use of quantitative data obtained from company documents provided support to help correlate any findings. An in-depth understanding of lean implementation and contextualised issues relating to LG was obtained through four key research questions. This process was consistently used throughout the study and the results were compared and critically analysed between findings from the literature review and the case study research. It was then possible to make comparisons and identify from the findings to help answer the research question '*is lean transferable into LG?'* and use this information to help recommend a new framework.

- Was the method of data collection appropriate?

Other techniques could probably have been used although the use of semi-structured interviews was felt to be the most appropriate method as it allowed for a rich set of data to be obtained which other techniques such as surveys could not provide. It is likely that participant observation may have added benefit during the data analysis stage to provide a greater awareness of significant issues experienced by the respondents during the lean interventions. This was impractical for this research as access to the case studies was restricted due to changes in NEC's business focus around commencement of the interventions. However, it is felt that observation in other LG lean training events and the range

of questions from the semi-structured interviews allowed insight to be gained from the respondents' experience and thoughts regarding the interventions.

The principal aim of the study was achieved through critical analysis of the academic literature and case study research in accordance with the methodology. The research paradigm was based upon a combined approach where a qualitative approach was used as the dominant paradigm. This was the most appropriate approach to use as the aim of the research was concerned with enquiring about processes and gaining an understanding of a situation. This approach best suits LG as their characteristics use a combination of processes and performances that involve interaction between people which are predominantly intangible.

A case study approach based upon multiple sources of evidence was used which allows the researcher to address a wide range of issues. The finding of information in a case study is also more convincing and accurate if it is based upon several different sources of information (Yin, 1994). The decision to use multiple sources of evidence in this case study approach was the most appropriate method as accuracy was paramount. Quantitative evidence obtained from documentation used by the lean consultants and the LG organisations was also used to help correlate evidence obtained from the semi-structured interviews. This method is known as triangulation which is a process used to strengthen interpretation and improve the quality of research that can reduce the impact of any biases which increases the validity of the study (Yin, 1994). This study used 'data triangulation' where evidence was sought from various groups of people across nine disparate case studies and at different levels within the LG organisation having used the lean intervention.

- Were there any limitations?

One possible limitation was the time needed to organise the semi-structured interviews. Access was restricted to three local authorities and nine detailed case studies, each covering a lean intervention in a different area of business within LG. Those interviewed were: (1) All lean consultants involved in the LG interventions, (2) One senior manager from each case study, which was a 100% representation of the respondent group and (3) One to two departmental members of staff from

each case study who completed all parts of the intervention including the National Vocational Qualification (NVQ) training. This was a variable range, where the average number of departmental staff in each case study completing all parts of the lean interventions and NVQ training was five. As there was some departmental staff who did not complete all parts of the intervention and NVQ training this meant access to interview LG departmental staff was restricted to availability and opportunity. The research was only interested in those participants who had completed all parts of the lean interventions and NVQ training so that accurate insight and understanding of their experience could be obtained. It is possible that an increased number of interviews could have been conducted if more time was made available although it is felt the amount and type of respondents interviewed was representative of LG. The range of questions allowed insight to be gained from the respondents' experience and thoughts regarding the interventions. Observation of training in lean tools and techniques from other NEC interventions in LG had also been made prior to commencement of the data collection stage. LG and NEC reports were used as part of quantitative evidence to help correlate data already obtained.

Due to the range of case studies, the type of individuals interviewed, questions asked and method of data collection it is considered that the results are sound to recommend a new lean framework.

### 5.3 Lean Model

- Would it have been beneficial to use another lean model for comparison?

In an ideal world it would have been beneficial to use another lean model to compare the results of the model used by NEC. However, the practical nature of the research made this unfeasible. NEC already had a delivery model that had been developed and implemented and the research was interested in looking at the transferability of it from manufacturing into LG. Useful mapping comparisons between this model and other models in manufacturing and health care indicated there was nothing significantly different with the content of the NEC model.

### 5.4 Diagnostic Tool

- Did the lack of an appropriate diagnostic tool have any effect on results obtained?

It is uncertain whether the lack of an appropriate diagnostic tool had any effect on the results obtained from each LG intervention. However the case study analyses revealed most decisions to reduce waste from departmental processes were made from gut feeling rather than using a diagnostic tool. Only two out of nine Productivity Needs Analysis (PNA) documents were completed due to irrelevant questions and inappropriate terminology being used. This most probably caused opportunities to be missed. As a result a diagnostic tool for specific use in LG would have been able to help prioritise opportunities to reduce waste from processes in areas in greater need of improvement.

The most challenging part of the research was the process of recommending a diagnostic tool for use in LG. Several attempts were made to formulate a standardised diagnostic tool for use across all LG departments to identify their current state of performance in line with efficiency goals such as cost, productivity and quality. It soon became apparent during this stage that a standardised approach cannot be used in the same way across all LG departments due to their variation of service provision and a lack of academic literature to describe how productivity is measured in LG did little to help this part of the research. It was the Government's New Performance Framework for Local Authorities and Local Authority Partnerships (H.M Government, 2007) described in the 'Towards a New Framework' chapter that was used to form the basis of an appropriate diagnostic tool. The Government document contains national indicators (NIs) that are used by LG departments as their key performance indicators (KPIs) to measure progress against a set of national outcomes and it is the only measurement method that Central Government uses to performance manage LG outcomes.

### 5.5 Summary

Key messages from the critical analysis are apparent. It is believed that:

1. The methodology was considered sound with reasonable representative case studies, appropriate questions and collection and analysis of data.

2. Whilst it would have been useful to compare results with another lean model, this was not possible. Although it is true that results from the NEC model were model dependent, it is believed this would not create model dependency as there is little difference in approach from other lean models which would also produce similar results. Useful mapping comparisons between this model and other models in manufacturing and health care indicated there was nothing significantly different with the content of the NEC model. Although a number of changes are required it would appear to be as a consequence of the LG context and their unfamiliarity with lean as a philosophy and approach to performance improvement and waste reduction. Therefore, unless another model is used which includes elements to overcome these context specific requirements for training and sustainability, which were not known about until the research was conducted, it can be assumed that some elements are in addition LG sector specific, rather than purely model dependent.

3. The diagnostic tool was difficult to develop as a generic method of identifying issues and areas for improvement. However, this did not significantly skew or bias the results and suggests the need for a better, more appropriate diagnostic tool for LG.

# Chapter Six

# Towards a New Framework

## 6.1 Introduction

The chapter sets out ideas for a new lean framework based on findings from the case studies. The chapter also provides justification and explanation of the new framework. Suggestions are put forward for a diagnostic tool which could be more appropriate for use within Local Government (LG).

## 6.2 Justification for a new Framework

This section identifies deficient elements from existing lean models in the case study analysis and literature review and discusses how these should be addressed towards developing a new lean framework for use in LG.

### 6.2.1 Diagnostic Tool

#### 6.2.1.1 What are the deficiencies?

1. NEC used a generic diagnostic tool, known as the Productivity Needs Analysis (PNA) in their interventions although out of a total of nine documents only two were completed in the LG case studies. This suggests a major problem with this part of the model. The PNA is designed for use in manufacturing organisations where the terminology and type of questions relate to their type of processes where input and output measurement is clearly defined. Reasons for non-completion of the diagnostic tool related to:

    - (a) Inappropriate questions: Senior managers reported they found difficulty in completing the PNA document due to the required data not being available or being too difficult to access. The PNA is designed to be used within manufacturing organisations where the type of data required for its completion is readily available. When used within LG the type of data required for its completion is irrelevant and leads to frustration when the document cannot be completed.

The terminology did not lend itself to LG due to the questions being inappropriate as already discussed. Some examples of inappropriate terminology can be found in the PNA question headings such as 'materials, labour and overheads' which are terms more familiar in manufacturing settings. One lean consultant stated he felt it was not necessary for the PNA to be completed in its current format and the document could be a lot simpler to complete as it currently asks too many questions. This factor also led to data not being available. Examples of some of the data required for completion of the PNA were:

- What is the ratio of first line managers according to shift patterns?
- What are the levels of 'Not Right First Time' (NRFT)?
- What is the floor space in square metres?
- How much floor space is used?
- What are the top six suppliers by spend and volume?

(b) Length of document is too long. The length of the document was too long. One senior manager (Case Study 8) stated the PNA did not add any value and he could understand other managers being put off adopting lean when confronted by the document. He suggested if the PNA is to be retained then it should be more concise.

2. Lack of relevant measures. Improvements were obtained without the completion of a high level diagnostic tool (PNA) across seven LG case studies where only two were completed. A search of the academic literature also failed to reveal the use of a high level diagnostic tool in LG. When measuring productivity Fryer et al (2009) states there is no single framework that suits every organisation. Measuring productivity within LG is considered to be difficult and complex. This is due to the multi-faceted and diverse range of services that are provided (Ghobadian et al, 1994; Jaalskelainen et al, 2009 and Fryer et al, 2009). Ghobadian et al (1994) suggests the problems are intensified due to services having a combination of tangible and intangible outputs or outcomes, customers rarely pay an economical price for services, there is no profit measure, nor is there an apparent link between services and cost to the electors.

Jaalskelainen et al (2009) adds the main reasons for the difficulty in measuring Public Sector (PS) productivity are due to variations in output quality, variations in service demand and the time difference between immediate outputs and final outcomes. Technical challenges specific to each department and political interference at Local and Central level adds to the difficulty in productivity measurement (Hodgkinson, 1999).

#### 6.2.1.2 How the deficiencies should be addressed

1. A diagnostic tool should be designed to identify weaknesses at departmental level in LG relating to:

(a) Use of available data. The PNA asked inappropriate questions due to a lack of LG data being available. The questions therefore need contextualising to become relevant for LG needs. PS processes consist of tangible and intangible inputs and outputs where customers are often present during the process. This issue is made more complex for LG organisations as their departments provide a vast range of services for the general public where the customer may not always be present during the process. A consequence of this suggests a standardised diagnostic tool cannot be used in LG due to the vast variation of service provision. Data being sought for completion in the diagnostic tool should therefore reflect the individual needs of LG departments. Suggested data required for completion of the diagnostic tool should include clear key performance indicators (KPIs) and benchmarks that are readily available and accessible for each LG department.

The diagnostic tool should be designed so that senior managers are able to answer questions relevant to their department relating to why their processes are being reviewed. A suggestion to be included in the new format was made by Consultant 1 who stated:

**'***What am I looking at? What do I expect out of it? Why am I looking at it? Here's what could be measured***.'** (Consultant 1).

(b) Length of document needs to be concise and relevant. The document needs to be more concise and ask relevant questions in relation to the LG department's benchmarks and KPIs.

2. Relevant measures. Process mapping was used during the Service Excellence Needs Analysis (SENA) stage of the case study interventions to help improve processes rather than combining its use with the PNA where senior managers relied upon gut feeling to identify where improvements should be focused. Process mapping was most commonly documented in the academic literature to help eliminate waste and improve processes in the PS case study examples. Although process mapping is useful to identify waste at departmental level it is more effective when used with a full-scale diagnostic tool to be completed by senior management as part of their business strategy to identify key areas for improvement based on the gap analysis. The PNA was seen by the lean consultants as being a relevant stage of the lean model because it measures the impact of any improvement activity within an organisation or department. Data relating to factors affecting productivity, cost or quality is obtained to identify the priority areas of lean implementation. One lean consultant stated on the relevance of the PNA during interventions:

**'**T*he key aspects to aid the success of the intervention include the PNA, the right team, right data ,right issues, right aims and objectives and the right amount of time to address the problem.'* (Consultant 2).

LG organisations prefer to focus on characteristics over which they have greatest control. Routine services such as waste collection and road maintenance tend to use technical efficiency measures to evaluate the volume of output achieved through a set volume of inputs. In comparison, professional departments such as libraries and planning would tend to use social effectiveness or quality of service measures (Dalton and Dalton, 1988). Therefore, a diagnostic tool should be designed to help senior managers identify what their specific department is trying to achieve within its performance framework and to measure the gap. A combination of individualised and standardised questions could be formed as part of the diagnostic framework and used as templates for future use in LG organisations

where similar processes are shared by departments. If the LG department is unable to find information to questions being asked then the diagnostic tool would identify a weakness in their system.

Productivity in the PS should not only concentrate on efficiency measures but also focus on what services achieve and how well they meet customer demand (Ghobadian et al, 1994). Fryer et al, (2009) identifies the use of performance indicators, more commonly known as KPIs are widely used throughout LG as a measurement tool which consists of four types: (1) output which is used to measure how much is produced, (2) welfare which is used to measure the value to the end customer, (3) performance which measures how the services are being produced and (4) composite indicators that combine all three of the above indicators (Stevens et al, 2006). Productivity measurement should focus on issues that are important to LG departments as identified in the LG Improvement and Development website (www.idea.gov.uk). It then could be argued that where LG departments fail to obtain available data in terms of benchmarking and KPIs this would indicate a weakness in the organisation rather than the diagnostic tool being inappropriate.

### 6.2.2 Tools and Techniques

#### 6.2.2.1 What are the deficiencies?

1. Limited selection due to the lean consultant's experience. The range of lean tools and techniques used within NEC's lean model appears limited for use in LG and are derived from manufacturing organisations to improve their production processes. The use of lean tools and techniques used in LG is limited due to the lean consultant's own experience in manufacturing and from the Business Improvement Techniques (BIT) programme which is part of the National Vocational Qualification (NVQ). One lean consultant stated although he was satisfied with the delivery of the lean model he was aware of the need to deliver and adapt the programme to suit the needs of LG departments in the future due their vast variety of services being provided. Lean consultants should explore which other lean tools and techniques can be used for use in

LG as boundaries have not yet been explored due to lean only being recently introduced into the sector.

2. Lack of contextualisation. There are no contextualised tools and techniques available for use in LG. Lean tools and techniques are not selected to suit the needs of LG departments but are more selected by the lean consultants as part of standardised training packages, according to their manufacturing experience. The lack of contextualised tools and techniques in LG should be addressed by the lean consultant. This would enable the LG internal lean leader and groups, during future lean projects, to identify and take ownership of a set of tools and techniques relevant for each departmental process. However, it is usual that lean consultants do not have knowledge or experience of processes specific to the vast range of LG services.

3. Inappropriate tools. Health and Safety is often reported by staff attending the BIT training programme as being an irrelevant part of the training as it is provided by LG organisation as statutory training.

#### 6.2.2.2 How the deficiencies should be addressed

1. Deploy lean consultants with relevant experience. The lean consultant should have personal experience and knowledge of LG issues in order to recommend appropriate lean tools and techniques to match the vast and varied departmental processes. This should include having knowledge of issues influencing departmental processes such as local and national policies. Care must be taken to select appropriate lean tools and techniques according to what is identified during the process mapping stage and contextualised according to LG departmental needs. Process mapping has been found in the academic literature and case study analyses to be the most consistently used lean tool and technique and should continue to be delivered in future lean training packages. A wider range of lean tools and techniques should be delivered and tailored to suit the LG department's needs.

2. Contextualisation of proven tools to meet differing needs for LG sector. Specific lean tools and techniques should be developed for use in LG rather than using those already deigned for manufacturing organisations. Services across LG are varied and intangible compared to manufacturing organisations so there is a need to develop a selection of contextualised lean tools and techniques transferable and relevant to their environment and type of service provision.

3. Focused and flexible range. A focused and flexible range of lean tools and techniques for use in LG should be carefully selected specific to departmental processes. This would help LG departments to take ownership and select each technique to best suit their departmental needs. Health and Safety should not be included as one of the lean tools and techniques as it is already provided in LG as statutory training. NEC has recognised Health and Safety as being an inappropriate element contained within the BIT programme and therefore eliminated it from the LF course.

### 6.2.3 Leadership

#### 6.2.3.1 What are the deficiencies?

1. Lack of senior management understanding and ownership. There is a lack of training to develop buy-in and personal development for LG senior management which is needed to embed lean as part of their organisational framework. Senior managers stated there were plans for staff to return to their departments and train colleagues in lean tools and techniques and volunteers were sought to train staff throughout LG organisations. It is impractical to expect staff that have recently attended a short training programme and have no long-term practical expertise in lean tools and techniques to train fellow colleagues or to embed it as part of their organisational framework. Lean is not normally part of the LG's organisational structure and therefore careful consideration needs to be given how this can be embedded to ensure it helps deliver the organisation's business strategy.

Although respondents had previously stated enough support and time were provided to attend the lean interventions some concern was raised that insufficient time and commitment could be a potential barrier for implementing lean in the future.

2. Lack of internal leadership development. Both the BIT and lean foundation training programmes failed to provide additional training to develop LG internal lean leaders. Once lean consultants have completed the interventions LG is left without support or guidance from them to continue with their transition into carrying out further lean activities. This makes it difficult for LG to continue using lean and become sustainable. It is also difficult to establish who will become responsible within the LG organisation to take charge of ensuring the lean transition is maintained.

#### 6.2.3.2 How the deficiencies should be addressed

1. Develop senior management understanding and ownership. Training should be made available for senior managers to affirm who would take overall responsibility for the lean agenda and to embed it in the LG organisation. Policy deployment should help to address this as LG senior managers must be committed to lean long-term by incorporating and documenting it as part of their business strategy, especially if extra funding is required out of the training budget to train the remainder of its staff in lean tools and techniques. Sufficient time should be provided for all levels of staff to attend lean training and to train internal lean leaders. Lean takes a long time to be embedded within any organisation and this should be made clear before the lean intervention commences. Senior management need to have an explicit understanding of this fact, so they are able to factor this into their plans and be able to manage internal staff's expectations.

2. Develop internal lean leaders. Developing internal lean leaders should be seen as an essential requirement if lean is to succeed long-term in LG. Additional training was suggested by the LG senior managers to develop

internal lean leaders in order to improve their chances of lean becoming embedded in their organisation and sustainability being achieved. This would benefit LG in becoming less reliant on external change agents whose knowledge is more familiar with manufacturing processes rather than LG. Evidence from the academic literature reports all of the PS case study examples consider training to be an essential element in their approach to lean which is carried out routinely in one week sessions across all levels of the organisations. The use of cross functional teams specific to the work area is present in each of the case studies in the academic literature whilst the use of internal lean leaders differs slightly in each PS example. The role of the internal lean leader according to the Toyota Production System model (TPS) however is integrated within a supervisory capacity as part of the daily routine. All of the health care case studies used internal lean leaders and training as part of their processes to achieve sustainability.

### 6.2.4 Training

#### 6.2.4.1 What are the deficiencies?

Issues one to three have been discussed in the earlier sections of this chapter but all result in the training element being deficient.

1. Lean consultants have no LG experience. The lean consultants and NVQ facilitators had no knowledge or experience of LG processes. Their background and knowledge of lean had been gained from manufacturing organisations which was evident from some of the terminology being used.

2. Lack of contextualised training in tools and techniques. There is no consideration for contextualised lean training to reflect the range of service provisions used within LG.

3. Lack of training to develop internal lean leaders and senior managers. Additional training was suggested by the LG senior managers to develop internal lean leaders in order for the organisations to become more

sustainable. No extra training was provided to support the expertise for senior management which is needed to embed lean as part of the organisational business framework.

4. Delivery model is inappropriate for LG needs. Problems arising from the BIT programme reported by both senior management and departmental staff respondent groups were too much emphasis and excessive length of time were placed on paperwork required for the NVQ which detracted from the course focus. Gaps in-between each training event in the BIT programme were reported to be too long and therefore needed to be reduced in order to maintain the learning group's momentum of interest in learning about lean tools and techniques relevant for their departmental needs. There was inconsistency in the delivery of the lean model for LG organisations using the BIT programme. The lean consultant was replaced by an NVQ facilitator following completion of the PNA, SENA and intervention identification stages. The role of the NVQ facilitator was to assess the LG participants' ability of meeting the NVQ required standards of competency in lean tools and techniques and to provide weekly support. No further contact was provided by the lean consultant until the end of the BIT programme where feedback was provided to the LG organisation in terms of how progress was achieved from the lean intervention. The LF course benefited in terms of a more consistent approach where only one external change agent was involved in the delivery the training programme. No support was provided by the lean consultant in the LF course apart from a review meeting to discuss how the LG department had eliminated waste using lean tools and techniques from a departmental process. Their focus for improvement was identified following the SENA stage. Similar benefits were achieved in both training programmes although the LF course was considerably shorter in duration.

5. No management of fear and suspicion. Respondents reported they had some suspicion and fear about the purpose of lean before the interventions. Staff reported they were worried that jobs were at risk of being cut and lean was a way of carrying this out. It is important that the lean consultant rectifies

this issue immediately because staff working in LG would become reluctant to participate in lean interventions and cause lean to fail.

6.2.4.2 How the deficiencies should be addressed

Issues one to three have been addressed in previous sections of this chapter but are relevant to the training element being improved.

1. Lean consultants should have LG experience. If lean is to be implemented by external change agents in the future then it would be more appropriate for them to have personal experience of working in LG, as previously discussed in issues one to three.

2. Training in tools and techniques contextualised to suit the needs of LG departments. An individualised and contextualised package of lean tools and techniques should be provided specific to the needs of LG departments.

3. Additional training to develop internal lean leaders and senior managers. Additional training would benefit LG departments in becoming less reliant on external change agents. Developing internal lean leaders would help lean become more sustainable in LG because once the external lean consultants have completed the lean training and interventions the LG organisation seeking their help is left without any support or direction. Extra training is also required to develop the expertise for senior management which is needed to embed lean as part of the organisational business framework.

4. Delivery model - specific to LG needs. Training should be delivered at convenient times to suit departmental needs and be delivered by one external lean change agent to maintain a consistent approach. The pace of the training should be tailor-made according to the needs of the department and gaps in between training sessions should also be negotiated to reflect the department's activity. Further lean training should be delivered specific to the needs of LG such as developing internal lean leaders and lean tools and techniques

appropriate for LG departmental needs. This should be a flexible delivery model as the research has identified LG provides a varied range of tangible and intangible services and a standardised delivery model that is appropriate for manufacturing organisations does not equate in the same way for LG. On-going support should be provided by the external lean change agent for the duration of the lean intervention and on completion to ensure issues of sustainability are achieved.

5. Managing fear and suspicion. Departmental staff reported their preference of receiving information prior to commencement of the training programme in order to allay any fears about lean. Better communication is needed by the lean consultant that the purpose of lean is to eliminate waste from processes rather than to cut jobs which is a misconceived idea shared by LG departmental staff.

### 6.2.5 Sustainability

#### 6.2.5.1 What are the deficiencies?

These issues result from those discussed previously although they come together to hinder sustainability:

1. Risk of lean being unsustainable through insufficient training and ownership. Once lean consultants have completed the interventions LG is left without support or guidance from them to continue with their transition into carrying out further lean activities. This makes it difficult for LG to continue using lean and become sustainable. It is also difficult to establish who will become responsible within LG to take charge of ensuring the lean transition is maintained. Cultural issues such as lack of commitment from staff, insufficient support from senior management and resistance to change are all factors which need further investigation and may prohibit lean's sustainability in LG.

2. Unrealistic expectations. A high expectation existed amongst respondents in the case study analyses for lean to bring quick improvements. This highlights a

concern for its transferability into LG as the academic literature has reported lean's transition in any organisation is a slow process. Reluctance from respondents towards lean implementation appeared to be associated with lean's automotive background.

6.2.5.2 How the deficiencies should be addressed.

These issues have been identified in previous sections although they need to be addressed to ensure sustainability:

1. All levels of LG staff to have knowledge of lean and take ownership. A new lean framework should be designed to include training for senior managers to provide them with a broad knowledge to implement lean as part of their strategy. This is additional to lean training provided for departmental staff. The development of internal lean leaders is crucial so that future projects may be planned and carried out in place of external change agents.

2. Realistic expectations. Information should be provided by the lean consultant and NVQ facilitator at the beginning of each intervention that the transition towards becoming a lean organisation takes a long time. This should be reinforced throughout the duration of the interventions and would help to dispel any unrealistic expectations for lean to bring about quick improvements. Terminology associated with the lean training should be contextualised for LG staff in order for them to be able to easily understand and apply lean tools and techniques in their departments.

6.2.6 Summary

This section has identified deficiencies with the existing lean model and suggestions have been made towards how they can be overcome. These issues will be used in the following section to embed these suggestions as part of a new framework for LG.

6.2.6.1 Deficiencies of the model

- Diagnostic Tool

1. (a) Inappropriate questions.
   (b) Length of document is too long.
2. Lack of relevant measures.

- Tools and Techniques

1. Limited selection due to the lean consultant's experience.
2. Lack of contextualisation.
3. Inappropriate tools.

- Leadership

1. Lack of senior management understanding and ownership.
2. Lack of internal leadership development.

- Training

1. Lean consultants have no LG experience.
2. Lack of contextualised training in tools and techniques.
3. Lack of training to develop internal lean leaders and senior managers.
4. Delivery model is inappropriate for LG needs.
5. No management of fear and suspicion.

- Sustainability

1. Risk of lean being unsustainable through insufficient training and ownership.
2. Unrealistic expectations.

6.2.6.2 What the new framework should include

- Diagnostic Tool

1. (a) Use of available data.
   (b) Length of document needs to be concise and relevant.

2. Relevant measures.

- Tools and Techniques
  1. Deploy lean consultants with relevant experience.
  2. Contextualisation of proven tools to meet differing needs for LG sector.
  3. Focused and flexible range.

- Leadership
  1. Develop senior management understanding and ownership.
  2. Develop internal lean leaders.

- Training
  1. Lean consultants should have LG experience.
  2. Training in tools and techniques contextualised to suit the needs of LG departments.
  3. Additional training to develop internal lean leaders and senior managers.
  4. Delivery framework - specific to LG needs.
  5. Managing fear and suspicion.

- Sustainability
  1. All levels of staff to have knowledge of lean and take ownership.
  2. Realistic expectations.

### 6.3 Towards a new Lean Framework for LG

Recommendations for the design of a new lean framework are based upon evidence from the literature review and case study analyses. Key findings in the question headings posed throughout the research have been used to help recommend a new lean framework for use in LG. Figure 6.1 provides a schematic plan of the various stages of the new framework which will be described later in this section.

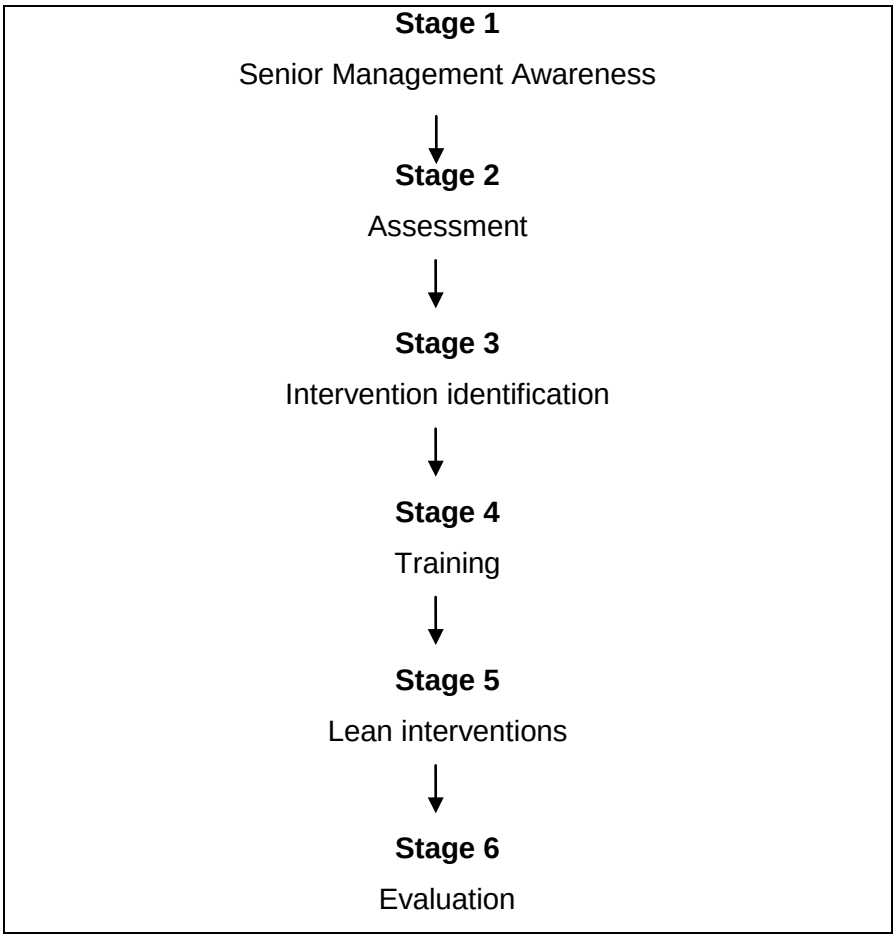


**Figure 6.1 Stages of the new Lean Framework**

6.3.1 Content / Approach

An in-depth analysis of five case study examples from the literature review and NEC's lean model have been used together with findings from the research, as summarised in section 6.2.2, to help formulate recommendations for a new framework. Table 6.1 illustrates these recommendations to be included in the stages of the new lean framework.

| Organisation …… Framework criteria | New Framework (SIT) | NEC | Toyota | Vanguard | VMMC | Theda Care | Flinders Medical Centre |
|---|---|---|---|---|---|---|---|
| **Framework name: reflects focus of activity** | X | - | X | - | X | X | X |
| **Framework based on Lean philosophy - 7 Wastes** | X | X | X | X | X | X | X |
| **Goal: improve quality, cost and productivity** | X | X | X | X | X | X | X |
| **High level diagnostic tool specific to the department** | X | Not specific | X | Not specific | - | - | - |
| **Contextualised tools and techniques (T&Ts)** | X | - | X | - | X | X | X |
| **Basic and flexible range of T&Ts** | X | - | X | - | - | - | - |
| **Process mapping** | X | X | X | X | X | X | X |
| **Problem solving** | X | X | X | X | X | X | X |
| **Continuous improvement/ PDCA/Kaizen workshop** | X | X | X | X | X | X | X |
| **Standardisation** | X | X | X | - | X | X | X |
| **5S** | X | X | X | - | X | - | - |
| **Visual management** | X | X | X | - | X | - | X |
| **Develop internal lean leaders** | X | - | X | - | X | X | X |
| **Utilise all staff in the framework - ownership** | X | X | X | - | X | X | X |
| **Policy deployment: to help embed lean into organisation** | X | - | X | - | X | X | X |
| **Management of expectations** | X | - | X | - | X | X | X |
| **Training** | X | X | X | X | X | X | X |
| **Delivery framework specific to needs** | X | - | X | - | X | X | X |
| **Change agent has relevant expertise** | X | - | X | - | X | X | X |
| **Address issues of sustainability** | X | - | X | - | X | X | X |

**Table 6.1 Comparison of Aspects of the Proposed New Framework (SIT) with other Lean Models.**

The title Service Improvement Transformation framework (SIT) has been chosen to coincide with efficiency improvements required by LG to reflect findings from the literature review and case study analyses. The title suggests its purpose is to make improvements within LG. There is no reference to the term ‘lean’ in the title as feedback from the academic literature and case study analysis suggested it may cause suspicion and alarm amongst staff who may interpret lean with making cash savings through redundancies. The SIT framework is built upon issues of good practice based and expanded on findings from the research and the four PS models described in the academic literature. It is based on the Lean philosophy which focuses on customer needs by eliminating waste from departmental processes to improve quality, productivity and reduce cost.

A high level diagnostic tool is provided specific to the department’s service area and is completed by the head of department and co-ordinated by the internal lean leader, otherwise known as the SIT facilitator, to identify priorities for improvement within the organisation. The diagnostic tool is designed to help senior managers identify what their specific department is trying to achieve within its performance framework using its set of KPIs and benchmarks that are readily available and accessible in the LG department. These include (1) cost which is applicable for all departments as they are required to operate within agreed budgets set by their organisation, (2) localised KPIs specific to each department that can be improved by eliminating waste from their processes (3) KPIs taken from the national set of indicators (NIs) that lend themselves to lean. A combination of individualised and standardised questions is formed as part of the diagnostic framework and used as templates for future use in LG.

Training is delivered to all levels of staff by one lean consultant to ensure a consistent approach is maintained who has experience of LG and should remain objective. Training will help all LG staff to establish ownership of processes and their attendance of the various stages depends on seniority and relevance. Information is provided to staff before the training commences to manage any unrealistic expectations of lean and to allay undue fear and suspicion of its purpose. The Lean philosophy including the seven wastes is delivered to all levels of staff and is followed by training in lean tools and techniques that are

contextualised to the department where the improvement process will take place. The delivery framework contains two packages of tools and techniques where the basic package consists of process mapping, problem solving and continuous improvement and a flexible range of tools and techniques that is delivered according to the department's needs.

Additional training includes policy deployment which is aimed towards the directorate, departmental managers and the internal lean leader. As lean is a new concept to LG they have no knowledge or experience of how lean should be embedded within the organisation to make long term improvements for the benefit of the end customer. Policy deployment is one way to do this. This system adds benefit by aligning the organisation's strategy and helps towards ensuring sustainability. The lean consultant provides support for the LG internal lean leader in weekly half day meetings over the duration of the intervention and for six months after the first completed lean intervention to review improvement success and to help with embedding lean into the LG organisation. This also ensures the likelihood of lean being successfully implemented within the LG organisation. Developing an internal lean leader will replace the need for an external change agent on completion of the intervention and contribute towards lean being embedded in the LG organisation.

There are cost implications for LG organisations seeking to adopt the SIT framework which is based upon the process and training requirements. This is in comparison to lean models incorporating the BIT programme that are marketed as free of charge. The research found the BIT programme to be an unsustainable business model as there are financial implications. The real cost incurred for LG organisations using the BIT programme is the length of time required for staff to attend the programme spent away from their daily tasks and the extra staffing resources being needed in their absence. The cost for delivering the SIT framework is calculated on a daily fee for the external change agent's time spent with each group. This price is calculated at £1000 per day based on standard consultancy fees who are able to provide training for between ten and fourteen candidates. The total cost of delivering the SIT framework based on the Lean Consultancy rate is £15,000.

6.3.2 Stages of the SIT Framework:

The SIT framework focuses on the Lean philosophy by eliminating wasteful activities from identified processes, involving all areas of the organisation and meeting customer demand. This is achieved through a six staged process including: (1) senior management and internal lean leader awareness, (2) assessment, (3) intervention identification, (3) training, (5) lean interventions, and (6) evaluation.

Stage 1: Senior Management and Internal Lean Leader Awareness

| DURATION | COST | INVOLVEMENT | PURPOSE |
|---|---|---|---|
| Half day | £500 (based on Lean Consultancy rate of £1000 per day). | Directorate (Senior management)<br><br>Head of Department (Middle management)<br><br>SIT Facilitator (internal lean leader) | a. Introduce purpose and process of SIT framework which is to eliminate waste from their processes.<br>b. Provide information that the SIT framework is based on Lean philosophy and uses a lean set of tools and techniques appropriate and contextualised for use within LG departments.<br>c. Gain understanding of current situation within the organisation and describe purpose of departmental assessment tool (DITA).<br>d. Discuss how the SIT framework can help eliminate waste and be embedded in the organisation through policy deployment and how training lean leaders and senior management can contribute towards this.<br>e. Discuss time framework, training, cost and resources involved with the SIT framework. |

**Table 6.2 Stage 1: Senior Management and Internal Lean Leader Awareness**

The first stage of the SIT framework begins with an introductory meeting held between the lean consultant, LG directorate, departmental management and the proposed internal lean leader who will be known throughout the organisation as SIT facilitator. The purpose of the internal lean leader is to take over the role from the external change agent on completion of the SIT programme. The reason for the meeting is for the lean consultant to explain the purpose and process of the

SIT framework and to gain an understanding of the current situation of the departments seeking improvement. Training requirements aimed towards the SIT facilitator and senior management are explained to describe how the SIT framework can help eliminate waste and be embedded in the organisation, supported by policy deployment. The purpose of training senior mangers and internal lean leaders in policy deployment is to help them align strategic decisions with departmental processes so that organisational goals can be reached effectively and issues of sustainability are maintained. A time framework for the length of the programme, training requirements such as the amount of staff expected to attend training, resources and cost implications are also discussed and agreed. The purpose and requirements for completing the diagnostic tool, entitled Departmental Improvement Transformation Assessment (DITA) are outlined in preparation of the assessment being completed during stage 2. The cost of Stage 1 is £500.

Stage 2: Assessment

| DURATION | COST | INVOLVEMENT | PURPOSE |
|---|---|---|---|
| Half day | £500 (based on Lean Consultancy rate of £1000 per day) | SIT Facilitator (internal lean leader) | a. Gain understanding of current situation using diagnostic tool (DITA). |

**Table 6.3 Stage 2: Assessment**

The second stage is mutually scheduled to complete the diagnostic tool which is attended by the lean consultant and SIT facilitator and takes place over a half day. This is to identify what areas the lean intervention should focus on and what type of improvement is seeking to achieve; i.e. cost, productivity, quality. The cost of Stage 2 is £500.

Diagnostic tool

The proposed SIT framework includes a diagnostic tool - 'Departmental Improvement Transformation Assessment' (DITA) which is used to identify the current state of the LG department in line with their efficiency goals such as cost, productivity and quality. The diagnostic tool assists the LG head of department to analyse LG departmental data and help understand how the department is performing and where the focus for transformation improvement should be made. This is to provide LG with a concise diagnostic tool using appropriate terminology and asking relevant questions to measure current productivity and performance. The diagnostic tool is aimed for use by middle management and co-ordinated by the SIT facilitator whose responsibility is for the data to be inputted before the following stage of the lean framework. Its purpose is intended to help identify waste to align departmental processes and meet organisational objectives.

Attempts have been made as part of this research to devise a diagnostic tool for use across the LG although the findings have revealed measuring productivity is difficult due to its varied service provision. It is made complicated due to variations in demand, quality and the time difference between outputs and outcomes being provided from the vast range of LG services. The inclusion of quality as well as quantity being part of its production process further complicates LG productivity measurement. There is a lack of academic literature to describe how productivity is measured in LG apart from the use of KPIs and departments tending to focus on characteristics specific to their type of service provision. It is for these reasons that a standard diagnostic tool must be avoided unless the organisation is only seeking to measure cost. The diagnostic tool must instead be designed to help senior managers identify what their specific department is trying to achieve within its performance framework using its set of KPIs and benchmarks that are readily available and accessible in the LG department. Individualised and standardised questions could be formed as part of the diagnostic framework and used as templates for future use in the LG organisation where similar processes are shared by departments.

Table 6.4 is used to suggest how a diagnostic template can be used for LG which is based on the New Performance Framework for Local Authorities and Local

Authority Partnerships (H.M Government, 2007). The document has been developed as part of the Comprehensive Spending Review (2007) to reflect the Government's national priorities. It consists of a set of NIs which is used to measure progress in LG against a set of national outcomes and it is the only measurement method that Central Government uses to performance manage LG outcomes. It also includes localised KPIs specific to each department that need to be improved by eliminating waste from their processes and cost which is applicable for all departments to operate within agreed budgets set by their organisation. This means any LG department using the diagnostic tool and is unable to find relevant information to appropriate questions being asked then the diagnostic tool would identify a weakness in their system. The diagnostic tool (DITA) should be completed before the commencement of any lean intervention within the LG department, and be used in six monthly intervals to monitor trends and improvements and identify where the focus for future interventions should lie.

The Lean philosophy is concerned with eliminating waste and DITA is used to as a diagnostic tool to help LG identify areas for improvement such as cost, quality and productivity. Some LG KPIs known as NIs do not lend themselves to lean however and will not be appropriate for DITA. Some examples include:

NI 69. What is the amount of children who have experienced bullying?
NI 71. How many children have run away from home / care overnight?
NI 32. What is the rate of repeat incidents of domestic violence?

KPIs from the NIs must lend themselves well to the Lean philosophy so their processes can be measured and improved by eliminating waste. Examples of some appropriate KPIs are illustrated in Table 6.4 to demonstrate how the diagnostic template could be used in LG to eliminate waste and improve cost, productivity and quality. Other KPIs are included that include cost which is applicable for all departments as they are required to operate within agreed budgets set by their organisation and localised KPIs specific to each department that can be improved by eliminating waste from their processes.

| Type of indicator | Department / Key Performance Indicator | Plan | Actual | Variance % | Priority for improvement |
|---|---|---|---|---|---|
| | **Planning and Sustainability Division** | | | | |
| **Cost** | **1.** What is the actual departmental cost against the planned budget? | £1m | £988k | -1.2 | 8 |
| **NI** | **2**. NI 157a How many major planning applications were processed within the 13 week target? | 500 | 400 | -20 | 3 |
| **NI** | **3.** NI 157b. How many minor planning applications were processed within the 8 week target? | 500 | 410 | -18 | 4 |
| **Localised KPI** | **4.** What percentage of customer complaints has been successfully resolved? | 100 | 50 | -50 | 1 |
| | **Neighbourhood Services Division** | | | | |
| **Cost** | **5.** What is the actual departmental cost against the planned budget? | £1m | £645k | -35.5 | 2 |
| **NI** | **6.** NI 199. What percentage of children and young people's are satisfied with parks and play areas? | 100 | 90 | -10 | 6 |
| **Localised KPI** | **7.** What rate of play equipment is repaired according to agreed plan? | 100 | 99 | -1 | 9 |
| | **Children's Services** | | | | |
| **Cost** | **8.** What is the actual departmental cost against the planned budget? | £1m | £1m | 0 | 10 |
| **NI** | **9.** NI 67.How many child protection cases were reviewed within the required timescales? | 1000 | 950 | -5 | 7 |
| **Localised KPI** | **10.** What percentage of telephone enquiries are successfully resolved according to agreed plan? | 100 | 88 | -12 | 5 |

**Table 6.4 Example of how a Diagnostic Template could be designed for use in LG**

Three random departments have been selected to demonstrate how their KPIs lend themselves to the Lean philosophy. A standard question relating to cost is relevant to each department because it is important to identity how their financial targets are being met in accordance with the organisation's planning. The diagnostic tool also asks additional questions which have been formulated from the NIs and localised KPIs specific to each department. Answers from the diagnostic tool provide a clear indication of areas requiring priority for waste reduction. Each question asks for statistics relating to the agreed plan and what has actually been achieved. The differences are compared against each set of results to provide a variance percentage in order to list key areas for improvement. The SIT facilitator, who is responsible for collating the data from the heads of departments, ranks the information in order as priorities for improvement. Table 6.4 illustrates that ten questions have been asked across the three departments and the information has been ranked as priorities for improvement. The example shows the priority for improvement lies within the division for Planning and Sustainability regarding customer complaints. Although a percentage variance to indicate priorities for improvement is a useful indicator, local knowledge will need to be considered to assess the significance of the percentage variance.

Stage 3: Intervention Identification

| DURATION | COST | INVOLVEMENT | PURPOSE |
|---|---|---|---|
| Half day | £500 (based on Lean Consultancy rate of £1000 per day). | Directorate<br><br>Head of Department<br><br>SIT Facilitator (internal lean leader) | a. Identify area of focus for the improvement intervention to occur and set objectives to be achieved.<br>b. Obtain Head of Department sponsorship for the intervention.<br>c. Identify which members of staff will be involved in the intervention and time-scale for improvement to take place. |

**Table 6.5 Stage 3: Intervention Identification**

The third stage is held following completion of the diagnostic tool and is attended by the lean consultant, directorate, head of department and SIT facilitator held over a half day. This is to review the completed diagnostic tool and inform which area the lean intervention should focus and what type of improvement it is seeking to achieve, i.e. cost, productivity or quality. In order to guarantee senior management commitment to the programme and ensure the likelihood of the project succeeding the head of department must sponsor the intervention. The objective of this is to improve issues of sustainability and organisational culture. A date for the intended training and intervention is confirmed during the meeting together with the amount of expected attendees and time-scale for improvement. The cost of Stage 3 is £500.

Stage 4: Training

| DURATION | COST | INVOLVEMENT | TRAINING NEEDS |
|---|---|---|---|
| 1 ½ days concurrent | Stage 4 costs £3,500 (based on Lean Consultancy rate of £1000 per day). | Directorate | (a) SIT / Lean philosophy and 7 wastes<br>(b) Policy deployment |
| 3 ½ days concurrent | | Head of Department (Middle management) | (a) SIT / Lean philosophy and 7 wastes<br>(b) Policy deployment<br>(c) Lean tools and techniques (basic and flexible range) |
| 4 days concurrent, except for diagnostic tool which is held during stage 2. | | SIT Facilitator (internal lean leader) | (a) SIT / Lean philosophy and 7 wastes<br>(b) Policy deployment<br>(c) Diagnostic tool – DITA (held during stage 2)<br>(d) Lean tools and techniques (basic and flexible range) |
| 3 days concurrent | | SIT team (departmental staff) | (a) SIT / Lean Philosophy and 7 wastes<br>(b) Lean tools and techniques (basic and flexible range). |

**Table 6.6 Stage 4: Training**

Information about the SIT framework is provided to staff, from whose department the interventions are occurring, prior to commencement of their training to allay any preconceived fears and to manage any unrealistic expectations. This is seen to be necessary based on evidence from case study analyses who reported they were wary about the objectives of lean before commencement of their training and interventions. The training programme combined with the lean interventions takes four weeks to complete, and some programmes may be shorter depending on the seniority of candidates involved in the improvement process where training for all levels of staff is held concurrently. The minimum length of time for training is one a half days which is attended by the directorate and the maximum time is four days attended by the SIT facilitator including the diagnostic training. Three days are

spent learning about the Lean philosophy, 7 wastes and associated tools and techniques which combine theory and practice specific to the LG work environment. This includes an explanation of the focus and goals of the SIT framework including a basic package of lean tools and techniques and a flexible package specific for the LG department of where the focus of the intervention is occurring. Policy deployment is delivered at this stage but is only aimed towards the directorate, head of department and the SIT facilitator which takes place over a half day.

Staff are required to put the theory based knowledge into practice commencing with process mapping which is used as a simulation exercise to help identify waste from any of their departmental procedures. Appropriate lean tools and techniques are selected according to task to help staff reach their goal and are followed by an evaluation to assess the impact of the lean intervention. The SIT facilitator, head of department and departmental staff are taught a range of lean tools and techniques that have been identified in the case study research and academic literature as being the most suitable for the needs of LG.

The SIT framework consists of two sets of lean tools and techniques. The first set is a basic package which provides focus and relevance for the department. These include (1) 7 wastes: which is included as part of the Lean philosophy and used to recognise which elements of waste are hidden within departmental processes. (2) Process mapping: used to create a clear understanding through visualising each stage of the process and make improvements, usually through eliminating wasteful activities, without altering the function of the process. (3) Problem solving: used to resolve issues by reflecting upon past experiences or solved using techniques to seek out the root cause. (4) Continuous improvement / PDCA / kaizen workshop used towards striving for quality as seen by the customer through proposing change within a process, implementing change, measuring results and taking relevant action. This is a group activity, used to identify problems amongst the departmental staff and improvements implemented within the process. Small incremental improvements involving all levels of the departmental staff are made on a continuing basis.

LG organisations provide a vast amount of tangible and intangible services where departments and their processes may be office-based, or whose services are provided amongst the general public such as street scene services and transport management. An additional flexible set of lean tools and techniques is provided to account for this difference which is delivered based upon their need and speciality. The flexible range includes (1) 5S (workplace management): this is suitable for office-based services where situations are needed to reduce waste, such as excessive time being spent searching due to poor layout. (2) Standardisation: this is a means of making improvements in the workplace by establishing a set of defined procedures that covers three aspects:

- Work time - the rate at which products or procedures are made within a process to meet customer demand. In an office environment this could be applied to services such as the planning department where there are deadlines to be met for planning applications.
- Work sequence - the order in which a worker performs certain tasks within a period of time. This could be used in manual services such as waste collection to ensure the most effective systems of work and routes are constantly maintained.
- Standard inventory - this is required to keep the process operating smoothly and could be used by front and back office staff to maintain effective filing systems.

(3) Visual management: anyone entering a work place, even those who are unfamiliar with the detail of the processes, can rapidly see what is going on, understand it and see what is under control. This could be applied in maintenance workshops where footprints and shadow boards may be used as a means of effective production control. In an office environment this could be applied to keep staff informed of developments such as progress boards and Gantt charts as used in hospitals. Examples for their use are to inform patients, visitors and staff on how a department or ward is performing in terms of managing MRSA or treatment rates.

The lean tools and techniques found in the SIT framework are similar to those used in the current NEC model and commonly shared with PS lean models and case studies in the literature review that have proven most useful in this type of organisation. The range and use in the SIT framework however are selected for the needs of each department and moves away from a one size fit all delivery model. The number of lean tools and techniques in the SIT framework has been limited to prevent LG from being overwhelmed and confused from the wide range of tools and techniques available. Most of the lean tools and techniques identified in the literature review are designed for use in manufacturing organisations for technical processes which limits their transferability into LG such as Total Productive Maintenance (TPM) and Design for Manufacture although it is recognised that some technical lean tools and techniques may be appropriate for use in some LG departments such as maintenance workshops. The total cost for Stage 4 is £3,500.

Stage 5: Lean interventions

| DURATION | COST | INVOLVEMENT | PROCESS |
|---|---|---|---|
| 1 day simulation. 1 day practical, followed by half day meetings held for the following four weeks leading up to completion of the intervention to support the SIT facilitator. Expected total duration of intervention is 4 weeks. | £4000 (based on Lean Consultancy rate of £1000 per day). | Head of Department (middle management)<br>SIT Facilitator (internal lean leader)<br>SIT team (departmental staff) | a. Process mapping to be used to identify waste within the department's process.<br>b. Select and apply appropriate lean tools and techniques according to the intervention.<br>c. Identify who will be responsible for improvements during the project.<br>d. Implement changes and monitor progress.<br>e. Agree realistic timescales for action and review. |

**Table 6.7 Stage 5: Lean Interventions**

Stage 5 consists of two lean interventions where the first one is led by the lean consultant and attended by the SIT facilitator, head of department and departmental staff. This intervention is a simulation based on previous LG improvement events and takes place over one day following completion of the training sessions which puts the new knowledge into practice. The second lean intervention is also held over one day and is led by the SIT facilitator and supported by the lean consultant. Its focus is selected according to feedback obtained from the diagnostic tool and process mapping is used by the group to identify waste within the department's processes. Appropriate lean tools and techniques are selected by the group for improvements under the supervision of the change agent who remains impartial from their decisions.

Impartiality of the decision process is important because the role of the change agent is to act as a coordinator by encouraging the group as a team to identify where their departmental problems lie and how these can be eliminated. Each member of the group is given a role in the intervention and realistic timescales for improvement and review are made by them. The role of the SIT facilitator is to participate and supervise in the intervention and liaise with the lean consultant for guidance as required. This intervention takes place over a period of four weeks and is held in the LG department. The lean consultant provides support for the SIT facilitator in weekly half day meetings over the following four weeks up until completion of the intervention. The total cost for Stage 5 is £4000.

Stage 6: Evaluation

| DURATION | COST | INVOLVEMENT | PROCESS |
|---|---|---|---|
| At the end of the lean intervention. Two meetings per month will be held for six months. | £500 per meeting (based on Lean Consultancy rate of £1000 per day). Total cost is £6000. | Directorate<br>Head of Department<br>SIT Facilitator (internal lean leader)<br>SIT team (departmental staff) | a. Head of Department (sponsor) to feedback progress to Directorate.<br>b. Directorate to relay relevant information that may have any impact on the focus of the intervention.<br>c. Review meeting to take place at the end of the intervention amongst directorate, head of department, SIT facilitator and SIT team. This will be to discuss how the lean intervention has progressed and what the final outcome has achieved.<br>d. Two meetings per month will take place between the external change agent and SIT facilitator. This will be to review improvement success and to help with embedding lean into the organisation by providing support for the SIT facilitator. |

**Table 6.8 Stage 6: Evaluation**

On-going advice and support is provided by the lean consultant to the SIT facilitator whilst the lean intervention takes place as described in Stage 5. Continuing support is provided by two meetings per month held between the lean consultant and the SIT facilitator for six months after the first completed lean intervention. This is to review improvement success and to help with embedding lean into the LG organisation and to ensure the likelihood of lean being successfully implemented within the LG organisation.

An evaluation report is completed between the lean consultant and SIT facilitator on completion of the lean intervention. This is followed by an evaluation meeting led by the lean consultant and attended by the directorate, head of department, SIT facilitator and SIT team. This meeting is used to discuss how the lean intervention progressed and what outcomes have been achieved. Communication must be maintained between the SIT facilitator, head of department and

directorate to relay any significant information that may have any impact on the focus of the lean intervention. Future lean training and interventions are co-ordinated and led by the LG organisation's SIT facilitator where stages 2 to 6 are repeated. The total cost of Stage 6 is £6000.

### 6.4 Summary

The chapter has set out ideas for a new lean framework to be recommended based on findings from the case studies. It has provided justification why a new framework is required together with suggestions for a diagnostic tool to be appropriately used in LG.

# Chapter Seven
# Conclusion and Further Research

## 7.1 Introduction

The purpose of this chapter is to summarise the research focus and what it achieved. Recommendations for further work are suggested.

## 7.2 Research Focus

Increases in public spending across the UK have caused the UK Government to pressurise Local Government (LG) into re-evaluating how productivity improvements and value for money can be better achieved. The consequence of this for LG departments has forced them to respond by delivering high quality services, provide value for money and raise standards of performance. The Lean philosophy and its associated techniques is one approach that can help LG achieve their efficiency targets. This is achieved through reducing waste by eliminating non-value added activities from processes which ultimately meets customer expectations, reduces costs and improves productivity. Lean has been successfully used by manufacturing organisations to reduce costs, increase productivity output and improve quality as determined by the end customer. It is because of these claims that lean and its associated improvement techniques was selected as the focus of this research.

The focus at the beginning of the study was in the Health sector and LG although a change of circumstance with the project sponsor required this to change. The research focus was amended to evaluate the transferability of lean manufacturing improvement tools and techniques to LG. The principal aim of the research was achieved through critical analysis of academic literature and case study research. This data was analysed and used together with the key research questions to recommend a framework to aid the success and operational performance of lean tools and techniques and within LG.

### 7.3 Achievement of the Research

The aims of the research set out to:

1. Assess the transferability of the Lean philosophy and its associated elements from the Manufacturing sector to LG.

2. Recommend a framework to aid the success and operational performance of lean tools and techniques within LG.

The research was conducted in conjunction with NE Consultants whose manufacturing derived lean model was the vehicle used to evaluate the issue of transferability into LG. In order to address the objectives of the research it was important to gain a detailed understanding of lean implementation and contextualised issues relating to LG. These were examined within both the literature review and case study analysis as formulated within the methodology. Related literature themes were used as sub-categories within each of the four key questions to generate further enquiry and gain a more in-depth understanding of key lean issues. Key questions and examples of issues within their sub-categories included:

1. What are the policy drivers and expectations from using lean?
    - Identify which policy drivers and reasons for change were provided by LG departments in their attempt to adopt lean.

2. How appropriate is the lean model, including its tools, techniques and process?
    - Model - was the lean model and diagnostic tool easy to understand and use? Was the model relevant for the organisation and how effective was the external change-agent?
    - Lean Tools and Techniques - how useful were the lean tools and techniques and were they easy to understand?
    - Appropriateness - how did lean compare to other productivity models used before the intervention?

3. What are the factors that may influence lean implementation success?
    - Process - what were the effects of the lean intervention upon time, resources and productivity for LG?
    - Organisational Culture - what effects did organisational culture have upon the lean intervention?
    - Sustainability - what were the issues and how did they affect the possible future use of lean within the organisation?
    - Barriers - what other problems were encountered that could affect lean's implementation success?

4. Have the intended outcomes been achieved?
    - What benefits were gained from the lean intervention?

Chapter two identified limited academic knowledge exists in LG where most work to-date in the Public Sector (PS) has been carried out in health care. Lean models used in health care have been contextualised for their specific use and cannot therefore be used in the same way for LG. This evidence was justified by examples described in Table 2.2 where the main focus for using lean tools and techniques was to improve nursing based activities. A dilution in the amount of lean tools and techniques across the PS is apparent which relates to the type of organisation and the progression of time. This evidence was provided in Tables 2.3 and 2.4 which described the amount of lean tools and techniques used by case studies in health care and LG. Findings from the academic literature revealed lean has become more established over a longer period of time in health care than in LG which explains why a wider selection of lean tools and techniques have been used by them. This is to be expected as similar findings were revealed in Table 2.1 which showed the differences between automotive and manufacturing industries. As lean was first introduced into the automotive industry it has become more established over a longer period of time than its manufacturing counterpart. Evidence from the PS case studies also suggested most of the transitions to lean are carried out by business consultancies who are experienced in manufacturing techniques but have little experience of LG. This may also explain why a narrower

selection of tools and techniques are used across the PS in comparison to the automotive and manufacturing industries.

Chapter four revealed lean is transferable into LG but caveats exist requiring changes to be made to ensure lean's sustainability and implementation. Deficiencies with the existing lean model were identified together with suggestions as to how they could be overcome. The main issues that are required to ensure the successful transferability of lean into LG were identified as:

- Leadership

Internal lean leaders are required to help LG become independent from the need of external change agents who may not be familiar with their processes and organisational culture. The background of external change agents, including both lean consultants and NVQ facilitators, should also derive from the same organisations for those they are helping to implement change.

- Training

The Business Improvement Techniques programme (BIT) is not a sustainable business model due to external funding requirements and inflexibility of the programme. The real cost incurred for LG organisations using the BIT programme is the length of time required by staff to attend the programme spent away from their daily tasks and the extra staffing resources being needed in their absence. Recommendations for the cost of delivering a new lean framework should be based upon the LG organisation's needs.

Training LG staff in the Lean philosophy and its associated tools and techniques would increase the likelihood of lean becoming more sustainable in LG and reduce cost implications incurred from external change agents. Training should be consistent and specific to the type of service being provided by LG and incorporate a relevant selection of lean tools and techniques suited to the departmental service process. Gaps between training sessions should be sufficiently spread according to the participants training needs and adjusted according to how quickly their knowledge is achieved.

- Diagnostic tool

The Productivity Needs Analysis (PNA) is currently not fit for purpose and should be modified and put into better context for LG. It should be concise in length, include appropriate terminology and use relevant questions to measure issues of productivity. As the diagnostic tool is aimed for use at senior management level it should be incorporated as part of their strategic plan to identify waste in their departmental processes and help towards complying with meeting organisational objectives.

- Tools and Techniques

At present the lean tools and techniques are linked to the BIT programme and are the same in the Lean Foundation course (LF) although there is scope to make changes in the latter. Process mapping should be retained as the analysis has proven that it is the most effective lean tool and technique which helps organisations identify waste from their processes and meet the needs of their customer whilst reducing cost and improving quality and productivity. Lean tools and techniques are manufacturing derived and need to be contextualised during training for use in LG. In order for LG not to be over-whelmed by the amount tools and techniques made available to them and risk lean not being adopted for its long-term use the range should be carefully selected.

- Sustainability

All staff believed lean would be adopted long-term and all senior managers confirmed there was a commitment to incorporate it within their strategy where departments had either begun using lean tools and techniques or were planning to use them in the near future. Two questions arising from this issue were (i) who will lead the transition for the LG organisations? and (ii) do they have sufficient lean knowledge? Once lean consultants have completed the interventions the LG organisations are left without support or guidance from them to continue with their transition into carrying out further lean activities. This makes it difficult for LG organisations to continue using lean and become sustainable. It is also difficult to establish who will become responsible within LG to take charge of ensuring the lean transition is maintained. Training internal lean leaders is therefore a main

component to ensure lean's sustainability in LG where this issue has already been identified within the model design.

Chapter five provided a critical analysis of the research methodology using a range of key questions to test the soundness of the methodology and the validity of the results and conclusions. Key messages from the critical analysis identified that (1) the methodology was considered sound with reasonable representative case studies, appropriate questions and collection of data, (2) although it is true that results from the NEC model were model dependent, it is believed this would not create model dependency as there was little difference in approach from other lean models which would also produce similar results. Useful mapping comparisons between this model and other models in manufacturing and health care indicated there was nothing significantly different with the content of the NEC model and (3) the diagnostic tool was difficult to develop as a generic method of identifying issues and areas for improvement. However, this did not significantly skew or bias the results and suggests the need for a better, more appropriate diagnostic tool for LG.

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Chapter six set out ideas for a new lean framework based on findings from the case study analyses and literature review providing justification and explanation why this was necessary. Suggestions were also put forward for a diagnostic tool which could be more appropriate for use within LG. The development of a new lean framework which incorporated suggestions for improvement entitled Service Improvement Transformation framework (SIT) was described that focused on the Lean philosophy by eliminating wasteful activities from identified processes, involves all areas of the organisation and meets customer demand. This was achieved through a six staged process including: (1) senior management and internal lean leader awareness, (2) assessment, (3) intervention identification, (3) training, (5) lean interventions, and (6) evaluation.

The title Service Improvement Transformation framework (SIT) was chosen to coincide with efficiency improvements required by LG to reflect findings from the literature review and case study analyses. Its title suggests its purpose is to make improvements within LG and avoids any reference to the term 'lean' in the title as

feedback from the academic literature and case study analysis suggested it may cause suspicion and alarm amongst staff who may interpret lean with making cash savings through redundancies. A diagnostic tool was provided specific to the department's service area and was designed to help senior managers identify what their specific department is trying to achieve within its performance framework using its set of key performance indicators (KPIs) and benchmarks readily available and accessible in the LG department. Training is delivered to all levels of staff by one lean consultant having knowledge and experience in LG to ensure a consistent approach is maintained. Training in the new framework is intended to help all LG staff to establish ownership of processes and to help overcome issues of sustainability. The delivery framework contains two packages of tools and techniques. The first set is a basic package which provides focus and relevance for the department. The second set of flexible tools and techniques is provided to account for the vast variation of services that are provided by LG. Additional training includes policy deployment which is aimed towards the directorate, departmental managers and the internal lean leader. As lean is a new concept to LG they have no knowledge or experience of how lean should be embedded within the organisation to make long term improvements for the benefit of the end customer. Policy deployment is one way to do this. This system adds benefit by aligning the organisation's strategy and helps towards ensuring sustainability. The lean consultant provides support for the LG internal lean leader in weekly half day meetings over the duration of the intervention and for six months after the first completed lean intervention to review improvement success and to help with embedding lean into the LG organisation. This also ensures the likelihood of lean being successfully implemented within the LG organisation. Developing an internal lean leader will replace the need for an external change agent on completion of the intervention and contribute towards lean being embedded in the LG organisation. There are cost implications for LG organisations seeking to adopt the SIT framework which is based upon the process and training requirements. This is in comparison to lean models incorporating the BIT programme that are marketed as free of charge. The research found the BIT programme to be an unsustainable business model as there are financial implications. The real cost incurred for LG organisations using the BIT programme is the length of time required for staff to attend the programme spent away from

their daily tasks and the extra staffing resources being needed in their absence. The cost for delivering the SIT framework is calculated on a daily fee for the external change agent's time spent with each group.

### 7.4 Were the Research Objectives met?

The objectives of the research were met. It bridged the gap in the limited information already known about lean deployment in LG. This was achieved by investigating the Lean philosophy, which models and lean tools and techniques were effectively used within LG and what support was needed for lean's long-term success. A critical analysis was made into the differences between manufacturing, health care and LG in terms of productivity which set out to justify the need to recommend a new lean framework for LG based on these findings. The research explained why a standard lean framework cannot be developed for general use across LG. Deficiencies were identified with the existing lean model used by NEC together with findings from the academic literature. It then became possible to recommend a new lean framework to aid the success and sustainability of the lean approach to waste reduction in LG.

The most challenging part of the research was the process of recommending a diagnostic tool for use in LG. Several attempts were made to formulate a standardised diagnostic tool for use across all LG departments to identify their current state of performance in line with efficiency goals such as cost, productivity and quality. It became apparent during this stage that a standardised approach cannot be used in the same way across all LG departments due to their variation of service provision and a lack of academic literature to describe how productivity is measured in LG did little to help this part of the research. It was the Government's New Performance Framework for Local Authorities and Local Authority Partnerships (H.M Government, 2007) described in the 'Towards a New Framework' chapter that was used to form the basis of an appropriate diagnostic tool.

The diagnostic tool is a concise diagnostic tool that uses appropriate terminology and asks relevant questions to measure current LG productivity. It is appropriate

for LG needs and is based on findings from their KPIs and benchmarks specific to the national indicators (NIs) set out in the New Performance Framework for Local Authorities and Local Authority Partnerships (H.M Government, 2007). It is used to identify the current state of the LG department in line with their efficiency goals so that hidden waste can be eliminated from processes that lend themselves to the Lean philosophy and make improvements in cost, productivity and quality.

### 7.5 Recommendations for further Research

The suggestion for further research is apparent. This would include:

- Implement the new framework, including the diagnostic tool, using participating LG organisations and lean consultants experienced with LG processes to assess reliability. At present it is not possible to carry out this stage due to changes in NEC's business environment although it is hoped this will change in the future.
- Evaluate the new framework in participating LG organisations using lean consultants experienced with LG processes to assess its effectiveness. A repeat evaluation carried out in the same way as the existing methodology is recommended. This would identify if any deficiencies with the existing lean model used by NEC have been sufficiently met. Necessary adjustments to the new framework could then be made according to feedback from the data analysis to ensure lean's future success and sustainability in LG.

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# APPENDIX (1)

## Table of Case Study Questions and Coding System

**TABLE OF CASE STUDY QUESTIONS AND CODING SYSTEM**

**Opening questions for senior managers and departmental staff: What is your position and responsibility within the organisation? What did your group look at?**

**Question 1: What are the policy drivers and expectations from using lean?**

| Senior Management | Departmental Staff | Lean Consultant | Related literature themes / Coding |
|---|---|---|---|
| 1. How much did you know about lean prior to NEC's involvement?<br>2. Who was involved in the decision process to adopt lean?<br>3. What was the purpose of adopting lean?<br>What was the main driver for change?<br>4. Is the decision to use lean part of a short or long term plan?<br>5. How quickly do you want lean to bring about changes? How much has NEC's intervention met your expectations? Explain your reasons. | 1. How much did you know about lean prior to NEC's involvement?<br>3. Did you feel there was a need for change before lean was introduced?<br>4. How quickly do you want lean to bring about changes? How has it compared with your expectations?<br>5. What did you want to achieve before NEC's intervention? | 1. What reasons were given by the organisation for wanting to adopt lean? | **Policy drivers 1 : 1**<br>-reasons for change (1:1a)<br>-expectations (1:1b) |

**Question 2: How appropriate is the lean model including its tools, techniques (T&Ts) and process?**

| Senior Management | Departmental Staff | Lean Consultant | Related literature themes / coding |
|---|---|---|---|
| 9. Have you any views of how the model can be improved for your department? Describe.<br>10. Do you believe the information you were given at the beginning of the intervention reflected the actual content?<br>11. Did you find lean easy to understand and use? Give examples to explain your reasons.<br>12. Did you find areas that were difficult to understand and implement? Explain your reasons.<br>13. What was your opinion of lean before NEC's intervention? Has it changed? Explain your reasons/ What do you think about lean now?<br>14. Has the programme helped to change your views about it?<br>15. Was a PNA discussed with you?<br>16. Did you complete a PNA? Explain your reasons.<br>17. Describe your experience of the PNA. Did you feel the PNA was useful or necessary? Did it fit in with the process mapping? Do you think the PNA is appropriate as well as the process mapping?<br>18. Were you involved in the SENA? | 10. Do you believe the information you received that was given at the beginning of the programme accurately reflected the actual content? Explain why.<br>11. Are there any areas that could have been better? Explain your reasons.<br>12. Explain what was good and bad in the programme.<br>13. Do you find lean easy to understand and use? Give examples to explain your reason.<br>14. Did you find areas that were difficult to understand and use? Explain your reasons.<br>15. Has the programme helped to change your views about it?<br>16. Describe your experience of the SENA / process mapping.<br>17. Do you think the use of an outside change agent was effective for your organisation? What would you change and why?<br>18. Was there a problem with there being no on-site lean leader?<br>19. If you were to carry out any lean activities in the future, would you prefer them to be carried out in-house or by a consultancy? Why?<br>2. What was your opinion of lean before | 6. What is your opinion in terms of how each of the stages performed?<br>7. Was each of the stages of the model relevant for the organisation / department? Why?<br>8. What parts of the intervention would you have changed? Explain why? Could the course be restructured?<br>9. Are there any parts of the stages that could be changed? Explain your reasons.<br>10. Was a PNA discussed? If so, explain how it was it carried out?<br>11. Was it completed adequately? If not, what parts of it were not completed? Why do you think they weren't completed? Was the PNA down to each manager of the department to complete or did others have any involvement with it? How could they identify their problems if they couldn't back anything with data?<br>12. Did the organisation explain any concerns with the PNA? Were the PNA and SENA linked as much as they identified a problem? How could the ones who didn't have a PNA get to identify a problem? Do you think the PNA is necessary?<br>13. Was the PNA necessary for the remainder of the intervention? Explain why.<br>14. Could any further lean interventions be carried out in-house by the organisation? Why? | **Model 2:1**<br>-opinion of each stage(2:1a)<br>-easy to understand (2:1b)<br>-easy to apply (2:1c)<br>-areas that were difficult to understand/implement (2:1d)<br>- comparison to other models used (2:1e)<br>-change agent (2:1f)<br>-PNA (2:1g)<br>-SENA (2:1h)<br>-relevance of model (2:1i) |

| | | | |
|---|---|---|---|
| (Process mapping) Explain your reasons.<br>19. Describe your experience of the SENA / Process mapping.<br>20.Do you think the use of an external change agent was effective for your organisation? What would you change and why?<br>21. If you were to carry out any lean activities in the future would these be carried out in-house or would you consider using a consultancy? Explain your reasons.<br>22. Was there a problem with there being no on-site lean leader? | NEC's intervention? Has it changed? Explain your reasons/ what do you think about lean now? | | |
| **Senior Management** | **Departmental Staff** | **Lean Consultant** | **Related literature themes / coding** |
| 24. Which lean T&Ts were useful?<br>25. Which lean T&Ts were not relevant or least relevant?<br>26. Will any of the lean T&Ts be used in other areas of the department? Explain your reasons. | 20. Were there any areas of the programme that you didn't understand? If so, explain.<br>21. Were the lean T&Ts easy to use? Explain your reasons.<br>22. Have any of the lean T&Ts been used in other areas of your work? If so, describe. Which lean T&Ts were useful?<br>23. Which lean T&Ts were not relevant or the least relevant?<br>24. Have any of the lean T&Ts made any difference to your workload?<br>42. Describe which of the lean T&Ts were the most beneficial. How were they achieved? | 15. How were the lean T&Ts selected? Does NEC have any say which of those elements go in?<br>17. Which lean T&Ts were delivered?<br>18. Were the lean T&Ts appropriate?<br>19. Were there any other lean T&Ts that were not delivered which you feel could have been beneficial for this department? Explain your reasons. | **Lean tools and techniques 2:2**<br>-ease of use (2:2a)<br>-easy to understand (2:2b)<br>-relevance to task (2:2c)<br>-effects on workload (2:2d)<br>-usefulness (2.2e) |

| | | | |
|---|---|---|---|
| 27. Have you used any other improvement techniques?<br>28. How does lean compare to any other productivity models used previously?<br>29. Has the programme targeted the appropriate resources including staff and budget?<br>30. Is the programme relevant to your departmental needs? Explain your reasons.<br>31. Does lean fit in with the organisation's needs? Explain your reasons why.<br>32. Describe how lean has helped to meet the customer's needs? | 25. Does lean fit in with your workload? Why.<br>26. Are the lean T&Ts appropriate for your departmental needs? Why?<br>27. Have you any experience of other improvement techniques used in your current workplace? If so, describe and compare.<br>28. Describe how lean has helped to meet the customer's needs. | 20. Was the programme aimed at the right people? Why?<br>21. Was the intervention appropriate for this type of organisation? | **Appropriateness 2:3**<br>-resources (2:3a)<br>-productivity (2:3b)<br>-departmental needs (2:3c)<br>-organisational needs (2:3d)<br>-customer needs (2:3e)<br>-targeted at right people and level (2:3f)<br>-workload (2.3g) |

**Question 3: What are the factors that may influence implementation success?**

| Senior Management | Departmental Staff | Lean Consultant | Related literature themes / coding |
|---|---|---|---|
| 33. Is the duration of the training programme enough? Explain your reasons.<br>34. What effects did the training programme have on resources, such as staffing and productivity? | 29. Do you feel you were part of the decision-making process during the intervention and were your opinions valued?<br>30. Do you feel the duration of the training programme was long enough?<br>31. Was the content of the programme aimed at the right level for you? Explain your reasons. | 22. Do you feel the model was aimed sufficiently towards each group? Explain your reasons.<br>23. Was there enough time and adequate resources to carry out the intervention successfully? | **Process 3:1**<br>-time (3:1a)<br>-resources (3:1b)<br>-tools and techniques (3:1c)<br>-effects on productivity (3:1d)<br>-relevance to own workplace (3:1e) |

| | | | |
|---|---|---|---|
| 35. What was the level of support that you provided for staff who took part on the programme? How was this achieved?<br>36. How does lean fit in with the organisation's culture?<br>37. How were members of staff selected for training in lean?<br>38. Who do you think will gain the most benefit from lean? Why? | 32. How were you made aware of the training?<br>33. How did senior management provide support whilst you were on the programme?<br>34. Has lean made any difference to your morale and that of your workplace?<br>35. Who do you think will gain the most benefit from lean? Why?<br>36. Explain your feelings upon being told you were to carry out training in lean.<br>37. What do you think is the purpose of introducing lean into your organisation? | 24. Do you feel all levels of staff were sufficiently involved in the programme? Why?<br>25. How does the intervention compare with other LG interventions?<br>26. What was the level of commitment from senior management? Did any of them attend the course? Did they attend all of it or was it a snapshot?<br>27. Was sufficient support provided from senior management in terms of training and time?<br>28. How does it compare with other LG authorities?<br>29. How does it compare with manufacturing organisations? Why do you think that is? | **Organisational culture 3:2**<br>-senior management involvement (3:2a)<br>-departmental staff involvement (3:2b) |
| 39. Has continuous improvement been made part of the organisation's strategy or part of change within the department?<br>40. Has lean become part of your strategic plan?<br>41. Do you plan to extend lean into other areas of your department? If so, how?<br>42. Are there any plans for further training in lean? If so, who will this involve and how often? Would you consider training staff into becoming leaders in lean?<br>43. What's going to happen with staff who have completed the lean | 38. How confident do you feel that lean will be continued in your department? Why?<br>39. Explain if lean has made any difference to your job?<br>40. Can lean help you in other areas of your work? Explain your reasons. | 16. Which levels of staff attended the training programme? | **Sustainability 3:3**<br>company culture (3:3a)<br>-training (3:3b)<br>-senior management (3:3c)<br>-departmental staff (3:3d)<br>-future use of lean (3:3e) |

| | | | |
|---|---|---|---|
| training?<br>23. Did you attend any part of the training programme? Explain your reasons why.<br>44. Have you received any positive feedback or observed any positive changes in the workplace? If so, describe. | | | |
| **Senior Management** | **Departmental Staff** | **Lean Consultant** | **Related literature themes / coding** |
| 45. Were there any problems or barriers during the intervention? If so, describe. Were there any other barriers?<br>46. Are you aware of any concerns raised from other members of staff taking part in the programme? If so, describe.<br>47. Has the intervention caused any unforeseen problems to the department such as cost implications and staff issues?<br>48. What reasons would you give for lean not being successful in your department? Explain your reasons.<br>49. Was the terminology used in NEC's intervention appropriate for your organisation? | 43. What in your opinion are the disadvantages of using lean?<br>44. Has the programme caused you any inconvenience? If so, why?<br>45. Do you feel you have been given enough time and facilities for your training?<br>46. Was the training suitable for your needs? What would you have changed and why?<br>47. Was the terminology used in NEC's intervention appropriate for your organisation? | 30. Describe any problems that were encountered during each stage of the intervention. How were these overcome? What kind of feedback did you get from people who attended the course?<br>31. Were these problems unique to this intervention? Explain your reasons.<br>32. Were the problems related to the organisation or the programme? Explain your reasons. | **Barriers 3:4**<br>-company culture (3:4a)<br>-training (3:4b)<br>-senior management (3:4c)<br>-departmental staff (3:4d)<br>-time (3:4e)<br>-resources (3:4f)<br>-terminology (3:4g)<br>-motivation/reasons for change (3:4h) |

**Question 4: Have the intended outcomes been achieved?**

| Senior Management | Departmental Staff | Lean Consultant | Related literature themes / Coding |
|---|---|---|---|
| 6. Which areas have gained the most benefit from NEC's intervention? How has it been achieved?<br>7. What changes have been made within the workplace?<br>8. What changes have been made regarding the customer? | 6. What changes have occurred within the workplace?<br>7. What changes have occurred to your workload?<br>8. What changes have been made regarding the customer?<br>9. Which areas have gained the most benefit from NEC's intervention? How has it been achieved?<br>41. Explain the good parts of the intervention. | 2. Identify the outcomes that were achieved upon the organisation.<br>3. Identify the outcomes that were achieved for the department.<br>4. Identify the outcomes that were achieved upon productivity.<br>5. Identify the outcomes that were achieved for the customer. | **Benefits 4:1**<br>-department (4:1a)<br>-organisation (4:1b)<br>-productivity (4:1c)<br>-customer (4:1d) |

# APPENDIX (2)

## Schedule of Questions

## (a) Lean Consultants

## (b) Senior Managers

## (c) Departmental Staff

**SCHEDULE OF QUESTIONS**

**(a) Lean Consultants**

1. What reasons were given by the organisation for wanting to adopt lean?
2. What is your opinion in terms of how each of the stages performed?
3. Was each of the stages of the model relevant for the organisation / department? Why?
4. What parts of the intervention would you have changed? Explain why? Could the course be restructured?
5. Are there any parts of the stages that could be changed? Explain your reasons.
6. Was a PNA discussed? If so, explain how it was it carried out?
7. Was it completed adequately? If not, what parts of it were not completed? If not, why do you think they weren't completed? Was the PNA down to each of the department to complete or did others have any involvement with it? How could they identify their problems if they couldn't back anything up with data?
8. Did the organisation explain any concerns with the PNA? Describe what these were. Were the PNA and SENA linked as much as they identified a problem? How could the ones who didn't have a PNA get to identify a problem? Do you think the PNA is necessary?
9. Was the PNA necessary for the remainder of the intervention? Explain why.
10. Could any further lean interventions be carried out in-house by the organisation? Why?
11. How were the lean tools and techniques (T&Ts) selected? Does NEC have any say which of the elements go in?
12. Which lean tools and techniques were delivered?
13. Were the lean tools and techniques appropriate?
14. Were there any other lean tools and techniques that were not delivered which you feel could have been beneficial for this department? Explain your reasons.
15. Was the programme aimed at the right people? Why?
16. Was the intervention appropriate for this type of organisation?
17. Do you feel the model was aimed sufficiently towards each group? Explain your reasons.
18. Was there enough time and adequate resources to carry out the intervention successfully?
19. Do you feel all levels of staff were sufficiently involved in the programme? Why?
20. How does the intervention compare with other LG interventions?
21. What was the level of commitment from senior management? Did any of them attend the course? Did they attend all of it or was it a snapshot?
22. Was sufficient support provided from senior management in terms of training and time?
23. How does it compare with other LG authorities?
24. How does it compare with manufacturing organisations? Why do you think that is?
25. Which levels of staff attended the training programme?
26. Describe any problems that were encountered during each stage of the intervention. How were these overcome? What kind of feedback did you get from people who attended the course?
27. Were these problems unique to this intervention? Explain your reasons.
28. Were the problems related to the organisation or the programme? Explain your reasons
29. Identify the outcomes that were achieved upon the organisation.
30. Identify the outcomes that were achieved for the department.
31. Identify the outcomes that were achieved upon productivity.
32. Identify the outcomes that were achieved for the customer.

**(b) Senior Managers**

What is your position and responsibility within the organisation?
What did your group look at?

1. How much did you know about lean prior to NEC's involvement?
2. Who was involved in the decision process to adopt lean?
3. What was the purpose of adopting lean? What was the main driver for change?
4. Is the decision to use lean part of a short or long term plan?
5. How quickly do you want lean to bring about changes? How much has NEC's intervention met your expectations? Explain your reasons.
6. Have you any views of how the model can be improved for your department? Describe.
7. Do you believe the information you were given at the beginning of the intervention reflected the actual content?
8. Did you find lean easy to understand and use? Give examples to explain your reasons.
9. Did you find areas that were difficult to understand and implement? Explain your reasons.
10. What was your opinion of lean before NEC's intervention? Has it changed? Explain your reasons. / What do you think about lean now?
11. Has the programme helped to change your views about it?
12. Was a PNA discussed with you?
13. Did you complete a PNA? Explain your reasons.
14. Describe your experience of the PNA. Did you feel the PNA was useful or necessary? Did it fit in with the process mapping? (Do you think the PNA is appropriate as well as the process mapping?
15. Were you involved in the SENA (process mapping)? Explain your reasons.
16. Describe your experience of the SENA / process mapping.
17. Do you think the use of an external change agent was effective for your organisation? What would you change and why?
18. If you were to carry out any lean activities in the future would these be carried out in-house or would you consider using a consultancy? Explain your reasons.
19. Was there a problem with there being no on-site lean leader?
20. Which lean tools and techniques (T&Ts) were useful?
21. Which lean tools and techniques were not relevant or the least relevant?
22. Will any of the lean tools and techniques be used in other areas of the department? Explain your reasons.
23. Have you used any other improvement techniques?
24. How does lean compare to any other productivity models used previously?
25. Has the programme targeted the appropriate resources including staff and budget?
26. Is the programme relevant to your departmental needs? Explain your reasons.
27. Does lean fit in with the organisation's needs? Explain your reasons why.
28. Describe how lean has helped to meet the customer's needs?
29. Is the duration of the training programme enough? Explain your reasons.
30. What effects did the training programme have on resources, such as staffing and productivity?
31. What was the level of support that you provided for staff who took part on the programme? How was this achieved?
32. How does lean fit in with the organisation's culture?
33. How were members of staff selected for training in lean?
34. Who do you think will gain the most benefit from lean? Why?
35. Has continuous improvement been made part of the organisation's strategy or part of change within the department?
36. Has lean become part of your strategic plan?
37. Do you plan to extend lean into other areas of your department? If so, how?
38. Are there any plans for further training in lean? If so, who will this involve and how often? Would you consider training staff into becoming lean leaders?

39. What's going to happen with staff who have completed the lean training?
40. Did you attend any part of the training programme? Explain your reasons why.
41. Have you received any positive feedback or observed any positive changes in the workplace? If so, describe.
42. Were there any problems or barriers during the intervention? If so, describe. Were there any other barriers?
43. Are you aware of any concerns raised from other members of staff taking part in the programme? If so, describe.
44. Has the intervention caused any unforeseen problems to the department such as cost implications and staff issues?
45. What reasons would you give for lean not being successful in your department? Explain your reasons.
46. Was the terminology used in NEC's intervention appropriate for your organisation?
47. Which areas have gained the most benefit from NEC's intervention? How has it been achieved?
48. What changes have been made within the workplace?
49. What changes have been made regarding the customer?

**(c) Departmental Staff**

What is your position and responsibility within the organisation?
What did your group look at?

1. How much did you know about lean prior to NEC's involvement?
2. Did you feel there was a need for change before lean was introduced?
3. How quickly do you want lean to bring about changes? How has it compared with your expectations?
4. What did you want to achieve before NEC's intervention?
5. Do you believe the information you received that was given at the beginning of the programme accurately reflected the actual content? Explain why.
6. Are there any areas that could have been better? Explain your reasons.
7. Explain what was good and bad in the programme.
8. Do you find lean easy to understand and use? Give examples to explain your reason
9. Did you find areas that were difficult to understand and carry out? Explain your reasons.
10. Has the programme helped to change your views about it?
11. Describe your experience of the SENA / process mapping.
12. Do you think the use of an outside change agent was effective for your organisation? What would you change and why?
13. Was there a problem with there being no on-site lean leader?
14. If you were to carry out any lean activities in the future, would you prefer them to be carried out in-house or by a consultancy? Why?
15. What was your opinion of lean before NEC's intervention? Has it changed? Explain your reasons/ what do you think of lean now?
16. Were there any areas of the programme that you didn't understand? If so, explain.
17. Were the lean tools and techniques (T&Ts) easy to use? Explain your reasons.
18. Have any of the lean tools and techniques been used in other areas of your work? If so, describe. Which lean tools and techniques were useful?
19. Which lean tools and techniques were not relevant or least relevant?
20. Have any of the tools and techniques made any difference to your workload?
21. Describe which of the lean tools and techniques were the most beneficial. How were they achieved?
22. Does lean fit in with your workload? Why.
23. Are the lean tools and techniques appropriate for your departmental needs? Why?
24. Have you any experience of other improvement techniques used in your current workplace? If so, describe and compare.
25. Describe how lean has helped to meet the customer's needs.
26. Do you feel you were part of the decision-making process during the intervention and were your opinions valued?
27. Do you feel the duration of the training programme was long enough?
28. Was the content of the programme aimed at the right level for you? Explain your reasons.
29. How were you made aware of the training?
30. How did senior management provide support whilst you were on the programme?
31. Has lean made any difference to your morale and that of your workplace?
32. Who do you think will gain the most benefit from lean? Why?
33. Explain your feelings upon being told you were to carry out training in lean.
34. What do you think is the purpose of introducing lean into your organisation?
35. How confident do you feel that lean will be continued in your department? Why?
36. Explain if lean has made any difference to your job?
37. Can lean help you in other areas of your work? Explain your reasons.
38. What in your opinion are the disadvantages of using lean?
39. Has the programme caused you any inconvenience? If so, why?
40. Do you feel you have been given enough time and facilities for your training?
41. Was the training suitable for your needs? What would you have changed and why?

42. Was the terminology used in NEC's intervention appropriate for your organisation?
43. What changes have occurred within the workplace?
44. What changes have occurred to your workload?
45. What changes have been made regarding the customer?
46. Which areas have gained the most benefit from NEC's intervention? How has it been achieved?
47. Explain the good parts of the intervention.

# APPENDIX 3

## Case Study Individual Analysis

## CASE STUDY INDIVIDUAL ANALYSIS

This section provides an in-depth analysis of replies obtained from individuals relating to their involvement in the case studies. Its purpose is to obtain a detailed understanding of their knowledge, opinion and experience of lean before, during and after the intervention.

**Lean Consultants**

Both lean consultants were interviewed separately following the end of the case study interventions; the first one being responsible for case studies one to eight and the second lean consultant being responsible for case study nine. For the purpose of this report they are known as Consultant 1 and Consultant 2. It was agreed on commencement of interview with Consultant 1 to make his replies collective when referring to case studies one to eight and to make additional comment about any significant interventions where appropriate.

Lean Consultant 1

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: Reasons for the organisations wanting to adopt lean were to improve their processes in line with Local Government (LG) and Central Government objectives and to meet national targets. There was a recognised need for change and NEC's lean approach came along at the right time and provided free training.

**2.** Appropriateness of the model

Model: opinion of each stage: The interventions all performed well due to the two LG organisations being proactive and the right point of contact being made from the outset. The right person within the organisation has to be approached where they must have the right level of authority to be able to make decisions and be influential. There have been occasions where the point of contact is too low down the 'pecking order' and they are over-ruled by managers who do not always release staff to attend training.

Change Agent: It is necessary for the study to discover how the role of the change agent is effective for the organisation. In order to answer this, the lean consultant was asked if any further lean interventions could be carried out in-house by the organisation. The lean consultant replied it is possible because the principle of the programme is to provide teams with skills and knowledge to carry on after NEC's intervention. He explained that both LG authorities plan to carry on using lean in the future.

Diagnostic tool: A PNA was discussed with a senior manager from the department where the intervention was to take place. It begins with the PNA form being sent to the managers for perusal and is followed up by a two hour meeting where further information about the department is obtained to discover which objectives are to be achieved. These objectives could be quality or process driven. The form is not always completed however and out of the eight interventions only one was completed. When asked why only one form was completed the lean consultant could not explain the reason for this. The lean consultant did report that the senior managers were struggling to find the required information and this was perhaps compounded by there being a lack of internal systems thee to provide the data. Some managers admitted difficulty whilst completing the PNA and admitted this was due to them not being able to source the information required by the lean consultant. It is however; still possible to measure any impact of the intervention without the PNA because information can be obtained from the participants during the intervention. The lean consultant believes it is not necessary for the PNA to be completed in its current format and he adds that it could be a lot simpler to complete and there are too many questions. He suggests it could ask issues such as 'what am I looking at; what do I expect out of it; why am I looking at it and here's what could be measured.' When asked whether the PNA was necessary for the remainder of the intervention the lean consultant replied it was only required at the beginning of the

intervention and not afterwards. The PNA provides measures and boundaries for the project where the SENA looks at the scope.

Relevance of model: Each of the stages according to the NEC model was relevant although it was not the same case with the units of the BIT / NVQ training. Usual feedback from most of the interventions was they didn't feel it was necessary to have the Health and Safety element as part of the training because the organisations already provide it as in-house training. This aspect is reported by the lean consultant as being out of NEC's control as it is the Quality and Curriculum's Authority (QCA) who insist the Health and Safety element must remain irrespective of which training is provided. The course has been reviewed by NEC to see whether it could be restructured because any enthusiasm gained from staff taking part in the process mapping and action planning exercises disappears when statutory training such as Health and Safety is discussed.

Lean tools and techniques: The lean tools and techniques are pre-selected as part of the mandatory units within the BIT / NVQ training but NEC do not have any choice of which of these elements is selected. However, it is possible to modify how the elements are delivered, as in the case of Health and Safety. The lean tools and techniques which are delivered include:

- Process mapping
- 7 wastes (Lean philosophy)
- Continuous improvement / PDCA / kaizen process
- 5S
- Standard operations
- Problem solving
- Visual management
- Health and safety

Relevance to task: It is seen by the lean consultant that the lean tools and techniques are appropriate for LG apart from Health and Safety. There were no other lean tools or techniques which the lean consultant felt necessary for the LG interventions.

Appropriateness: It is seen by the lean consultant that the programme is aimed at the right people because it involves the people who are doing the job on a day to day basis.

Organisational needs: The programme meets the departmental and organisational requirements.

**3.** Factors that may influence implementation success

Process: The lean model was aimed sufficiently towards each group and although the training is a standard format, everything revolved around what each particular group wanted to focus on.

Time: There was enough time to carry out the intervention.

Resources: The resources were adequate for carrying out the intervention although it is not always the case with other LG organisations. Resource is often an issue where at the start of the course the attendance may be perhaps seven or eight but towards the end it may deplete down to three or four staff. It goes back to the issue of having the right point of contact and having a person who can over-rule other managers when it comes down to putting staff forward for training.

Organisational culture: The interventions performed better than in previous LG organisations in terms of providing suitable dates, background information about the service and arrangements for the training. Compared to manufacturing organisations there is less enthusiasm and commitment to the lean intervention. The lean consultant sees this as an issue due to culture and political motives and suggests there is very little commitment in LG organisations in terms of team work.

Senior Management involvement: Senior managers attended the training programmes and they addressed the individual groups at the beginning by making a speech explaining why the lean intervention was important for the service. They also attended the feedback sessions at the end of the programme. Sufficient support was provided by senior management in terms of training and time.

Departmental Staff involvement: All levels of staff were sufficiently involved in the programme.

Sustainability: effects on organisational culture: All levels of staff attended the lean training. Senior management did take part in the interventions but this usually depends on the influence of the person with who is the point of contact.

Barriers: The lean consultant was asked to describe any problems or barriers that were encountered during each stage of the interventions. None were identified in either LG organisations although the lean consultant reported there is usually some kind of problem. He stated the biggest problem is when there is supposed to be a team of a certain size in order for the training to take place and there are non-attenders through various stages of the training. He sees this as the biggest problem because non –attenders have two impacts. One is they do not get the evidence which is required for the qualification and they have to catch up on work that has been missed requiring more assessor time. Secondly, the project suffers where instead of having perhaps eight people carrying out the actions for the intervention, there may be only four or five so this has an impact where the work may be delayed. Problems relating to the interventions were reported by the lean consultant to occur from the organisation rather than the programme where there may be a lack of internal communication between staff and departments regarding future events with the training.

Feedback from staff attending the programme is the Health and Safety aspect is not necessary due to it being already provided by the organisation as statutory training. The SENA activities are popular but enthusiasm soon disappears once any paperwork necessary for the qualification is completed. The 5S exercise is sometimes an issue due to lack of communication internally from senior managers or service managers where they may fail to inform departmental staff not taking part on the training that the 5S exercise would be taking place in their work area. This sometimes causes friction.

Motivation / reasons for change: On close of the interview the lean consultant was asked if he had any further comments to make which he felt important for the study. He reported because the BIT / NVQ training is free, it is easier for managers to take their staff away from the training sessions rather than if they had paid for it. He did not feel this issue may necessarily be the root of the cancellations but thought paying for something allows a feeling of worth and people tend to commit themselves to a project and make it work than if it cost nothing. He could not relate this to fact but stated this was a personal feeling.

**4.** Achievement of intended outcomes

Benefits: Impact upon each area was described in the 'Intervention Summary reports' which is subsequently documented in the Case Study Overview (Table 4.1). Although results from each intervention had varying impact it can be suggested that improvements in quality and reductions in cost and delivery were obtained.

Lean Consultant 2

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: According to the lean consultant there are many reasons for the organisation wanting to adopt lean. He reports the main reason is due to the environment in which organisations are operating in where customers are demanding more and there is a wide variety of choice. He adds there is more pressure placed on the organisation to meet customer demand whilst they have to achieve shorter lead times and work within tighter budgets. Through the lean

consultant's experience, LG organisations are attracted to the lean approach because its emphasis is on the customer and it identifies customer demand and meets their needs. The organisation's process can then be analysed using the knowledge of its staff to understand where any problems may occur and where the improvement potential may be in order to realise any benefits and savings. This reason for change was given by the LG organisation seeking to use NEC's intervention, particularly with regard to the current economic climate and needing to meet strategic drivers set on a five year basis. This includes what the organisation is going to achieve, how they are going to engage with their customers and work with their partners plus how they can improve their cost base. Lean is therefore seen by them to as a method to help meet those objectives. With regard to the corporate performance management team (CPM) there were many unnecessary measures and the systems they had in place were hindering them from delivering services to their customers and failing to identify customer needs.

**2.** Appropriateness of the model

Model: opinion of each stage: The lean consultant was asked how each of the stages performed during the programme. He was satisfied the programme performed well and explained that after only a short period of time the team attending the course took control and led the way in making their own decisions for change. The team were very outcome focused and keen to adopt change. On the second day an Executive Director attended the programme which initially unsettled the dynamics of the team although his input was seen by the lean consultant to be useful. It was later when the team split into two groups that the mood became more relaxed and the executive manager adopted a modest role in the group. It was difficult for the lean consultant to describe whether he would recommend any changes to the intervention as he was still awaiting feedback from the team. He suggested the programme could be restructured and delivered in a number of ways although he remains satisfied with the current model used in this intervention. The lean consultant explained that although each of the stages in the model is standard he was aware of the need to deliver and adapt it to suit the audience. He explained what could be useful in terms of sustainability for the organisation is the development of a collaborative network. The purpose of this would enable staff to discuss and share ideas with colleagues regarding their involvement with lean. This idea is also being discussed within the LG organisation.

Change Agent: It is necessary for the study to discover how the role of the change agent is effective for the organisation. In order to answer this, the lean consultant was asked if any further lean interventions could be carried out in-house by the organisation. It was reported that the CPM team are already carrying out training on a local level and they have identified a business improvement technique based upon what had been learnt from the intervention. The team are also hoping to improve their data base in consultation with their customers.

Diagnostic tool: A PNA was discussed with the Acting CPM manager who later completed it to a high standard using good quality data. There were no concerns expressed from the manager regarding its completion and data from the PNA helped to identify how to address process level problems. The lean consultant stated the PNA was necessary for the remainder of the intervention where quality issues were identified in the SENA stage through process mapping. According to the lean consultant the key aspects to aid success of the intervention include 'the PNA, the right team, right data, right issues, right aims and objectives and the right amount of time to address the problem.'

Relevance of model: The three day foundation programme is different to the BIT / NVQ training programme and is more commercial. It is seen by the lean consultant to be relevant for this organisation.

Lean tools and techniques: The course is a standard approach and its aims are to understand who the customers are; understand the system's purpose; understand the system's measures and understand the system. It is from this last step where the lean tools and techniques are selected. The lean foundation training is flexible and allows a wide range of lean tools and techniques to be used

according to the needs of any identified problem. The lean consultant states however, that the BIT / NVQ programme contains core lean tools and techniques which he considers to be applicable in any environment where the foundation training alternatively allows the problem to dictate which tool is selected. NEC has a say in which of the elements are selected in the foundation training which is the responsibility of the lean consultant and training facilitator. The lean tools and techniques which are delivered include:

- Process mapping
- 7 wastes (Lean philosophy)
- Continuous improvement / PDCA / kaizen process
- 5S
- Standard operations
- Problem solving
- Visual management
- Data analysis and measurement

Relevance to task: Because there is an element of flexibility in the lean foundation course the lean consultant believes the lean tools and techniques are appropriate and were relevant during the intervention. The lean consultant believes policy deployment, which is not offered at foundation level, is another lean technique that may be useful to meet sustainability within an organisation.

Appropriateness: The intervention was aimed towards the right level of staff and was appropriate for the type of organisation, according to feedback obtained from the participants on the course.

Organisational Needs: There was a cross-section of staff who attended the course including customers and technical support from services within the LG organisation.

**3.** Factors that may influence implementation success

Process: The model was sufficiently aimed towards the group and the focus was shifted according to the needs of the team. Feedback on close of the intervention reflected the success of the training in terms of meeting their needs.

Time: There was enough time to carry out the intervention and in the short period of time the lean consultant felt a lot had been achieved.

Resources: There were adequate resources provided by the LG organisation to complete the intervention.

Organisational culture: All levels of staff were sufficiently involved in the programme. Compared to other LG interventions, the lean consultant felt this one was positive in terms of sustainability where he believes lean will be used throughout the organisation in the future. LG can be compared with manufacturing organisations where the lean consultant sees differences lie in the types of processes being used. He believes LG organisations find difficulty in visualising how they're performing due to the nature of their work and processes being used. There are similarities between both sectors however, such as senior management alignment, connection, buy-in, staff realisation, reaction and change. From the lean consultant's experience, staff in manufacturing organisations tend to be more direct and forthright by verbalising if they have any problems with lean training where staff in LG remain quiet. There would, for example, be passive resistance from LG staff who may attend the training but later refuse to fully co-operate with the new project and cause its failure.

Senior management involvement: Senior management and service managers attended the training which included an Executive Director on the second day.

Sustainability: organisational culture: It was reported that the CPM are already carrying out training on a local level and they have identified a business improvement technique based upon what had been learnt from the intervention. The team are also hoping to improve their data base in consultation with their customers. All levels of staff throughout the LG organisation attended the three day foundation course. There is good support from senior management in terms of ensuring lean's success throughout the organisation.

Barriers: The only problem that was encountered was a personality clash between two members of the team although their issues were soon resolved. The problem was not unique to this intervention and the same issue has occurred elsewhere. The CPM department was committed to the programme and it was well supported throughout the organisation.

**4.** Achievement of intended outcomes

Benefits: The biggest result from the intervention was for the group to identify their purpose and change their thinking. By the end of the intervention the group changed their emphasis from a role of reporting corporate results to Central Government to helping services within the LG organisation understand and measure what matters to the customer and how they could respond to that. The CPM team are now having a full-scale review using lean to help redesign their system. It is anticipated to have the new system running by April 2009.

Before the intervention was carried out the CPM department spent approximately 17% of their time seeking data from other services within the LG organisation. A question was raised by the group why time was wasted seeking information that was not important in how these services ran. The shift will now move to request data that is critical to their day to day operations. There are also plans to reduce the 'Service Plan' document which is approximately 150 pages thick and their objective is for it to contain no more than two sides of A3 paper. This will hopefully help their customers understand what data is required for the twice yearly reports.

During the intervention there was a 'challenger to the event' who was a service manager from ICT. The group found it beneficial for an outsider to attend the intervention because it gave them an opportunity to ask what customers wanted from their service and how it could be improved to meet their needs. The CPM department will now respond to customer demand and move to a more supportive role. This will be achieved by developing as appropriate service plan for the individual services rather than continuing with the current plan which is a 'one size fits all' 150 page document.

**Senior Managers**

Senior managers and service managers, who had all attended NEC's programme, were interviewed separately following the end of the case study interventions. One manager from each case study was interviewed and questions posed to those representing case studies five and seven were used as pilot studies to test the validity of the study where it became necessary to add extra questions in order to make the study more robust.

Senior Manager: Case Study 1

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager stated he already had some knowledge about lean prior to this intervention, which was obtained from previous employments. The senior management was involved in the decision process to adopt lean at it was the Chief Executive (CEO) who introduced it. The purpose of adopting lean is to bring about efficiency savings throughout the organisation. One of these is to make cashable savings, which is a Government target and the manager believes if these are not met, then it will impact on the services provided. The manager stated the main policy driver responsible for change is Gershon, where the purpose of this is for LG to meet Government targets, save money and work more effectively. The decision to use lean is a

long term plan. The manager explained the organisation is keen to get lean embedded into the culture of the LG authority quickly and it has achieved this by sending more staff onto the lean training courses then any neighbouring LG authorities. He believed continuous improvement becomes part of the culture and gets everyone to look at ways of making improvements.

Expectations: The manager would prefer lean to bring about changes as soon as possible and the LG organisation was looking for both quick wins and long-term wins. He stated it must realistically be a combination of both however, because lean needs to get embedded into the culture. The intervention has met the manager's expectations because of his past experience of lean.

**2.** Appropriateness of the model

Model: When asked if the manager had any views regarding how the lean model could be improved for his department he replied there was not because the process that was followed during the programme was presented in a way that was easily understood. The programme consisted of analysing the process being used by the department and looking at making improvements by adding value and removing non-value added activities. When asked about his opinion of lean before the intervention he stated that he was in favour of it due to his past experience of working with some of the techniques. His views have not changed since the intervention.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. The manager felt Health and Safety was irrelevant in the programme as he already received training in this area from the LG authority. Paperwork required for the NVQ also got in the way of learning where extra time could have been spent learning about more lean tools and techniques. He added the 'be all and end all wasn't obtaining the qualification but learning about the lean process was the real issue.'

Easy to understand and apply: The manager found lean easy to understand and use. The group identified areas in the process that created both delays and value added areas. He considered lean to be common-sense and is all about cutting out unnecessary parts of a process and concentrating on the parts which add value.

Areas that were difficult to understand / implement: There were no areas that the manager felt difficult to understand and implement due to his previous experience and knowledge.

Change Agent: The manager believed the use of an outside change agent was effective because he stated staff within LG tend to believe things more from outsiders rather than internally. Through past experience nobody takes much notice of what is being said if anything is discussed within the organisation. When asked if there was anything that he would change he replied Health and Safety should be omitted from the programme and avoid the regimented way of storing things above head height, where he considered this to be more appropriate in a manufacturing environment rather than in LG. The manager was asked if the organisation was to carry out lean activities in the future would he prefer these to be carried in-house or by using a consultancy. He replied that he would prefer an outside change agent as staff tend to take more notice of outsiders.

Diagnostic tool: A PNA was not discussed with the manager and is therefore not aware of its purpose.

SENA: The manager was involved in the SENA process. When asked about his experience of the SENA he replied it was quite straight-forward when the group looked at the different stages involved in the post-room. The group mapped out the process of how mail is received into the building and the various stages that are reached before it reaches the departments. For the purpose of the exercise, the group looked at the planning department and the impact of mail delivery for them.

Lean tools and techniques: Process mapping, 5S and standardisation were the most useful lean tools and techniques.

Relevance to task: Health and Safety was seen to be the least relevant lean technique. Lean will be used in other areas of the manager's department.

Effects on workload: Lean is being used in other areas of the manager's department where changes have been made in the way technology is used. Process mapping is being used to review how efficiency improvements can be used within the election system.

Appropriateness: comparison to other models used: The manager has used another improvement technique before called Business Process Re-engineering (BPR). When asked to make comparisons between them, he explained 'lean can be used within a current system where BPR alternatively starts from scratch where it is possible to select what aspects of the process are needed from the outset.'

Resources: The programme has targeted appropriate resources including staff and budget.

Departmental needs: The programme is relevant to the manager's departmental needs where he explained it is important in his area of work to keep reviewing what is being done and discover whether improvements can be made. He understands lean makes this possible due to the techniques that it brings together with striving for continuous improvement.

Organisational needs: Lean fits in with the organisation's needs where it is continually seeking ways to improve and become more efficient. It needs to meet Government targets and make better use of resources. The LG organisation is required to make use of better services for the public and this can only be achieved if there are available resources to carry this out. Anything that is going to help the LG authority meet better resources is beneficial to the organisation.

Customer needs: When asked to describe how lean has helped to meet customer's needs the manager stated the purpose behind Gershon was that a higher proportion of resources should go to the customer rather than back office. He believes this means making a shift from back office to front-line customer services. Any efficiency within the organisation will be passed onto the customer.

**3.** Factors that may influence implementation success

Process: time: The duration of the training programme was enough.

Resources and effects on productivity: The manager did not feel effects of the training programme had any adverse effect on resources, such as staffing and productivity. He stated there was no issue because there were no elections for the department to arrange this year so it did not impact resources.

Organisational culture: The manager believes lean fits in with the culture which the organisation would like to have but may not necessarily fit in with everyone's views. He thinks it is a step in the right direction however. The manager believes the LG authority will gain the most benefit from lean due to resources being 'freed up.' This will then be passed onto the end customer.

Senior management involvement: The manager attended the whole programme.

Departmental staff involvement: Staff were selected for lean training through senior management requesting volunteers.

Sustainability: organisational culture: The manager has not received any positive feedback from staff who attended the programme although positive changes have been made within the

workplace. This has come within the manager's department where the office has been reorganised to become more efficient.

Training: The manager is not aware of any plans for further training in lean but he feels the intention is for staff who have already attended the training to go back to their departments and become lean leaders or mentors in their area.

Senior management: When asked what level of support was provided by him for other staff taking part on the programme the manager replied this wasn't relevant for him to answer as there was only one more member of staff within his department who attended the training. The manager believes lean will become part of the organisation's strategic plan once it becomes more embedded within the culture.

Future use of lean: There is commitment from senior management for lean to be continued within the organisation and because there is an interest from councillors there is an expectation for lean to be used long-term. Within the manager's department lean is going to be central to their process where it will be incorporated within the election and judicial system.

Barriers: When asked if there were any problems or barriers during the intervention the manager replied there was a degree of obstruction from people within the group where they were rather defensive of the way they had carried out tasks in the past. He believes the Lean philosophy could have been explained better to allow better understanding. There was an emphasis put across to staff that they would receive an NVQ certificate from the intervention rather than the group being informed of the real benefit that lean would bring about. Concerns raised from other members of staff on the programme were Health and Safety was irrelevant during the training.

Resources: The manager stated he was not aware of any unforeseen problems caused by the intervention upon the department.

Terminology: Terminology used in the programme was relevant for the organisation's needs. The course leader managed to translate examples used within manufacturing environments to those used in LG.

Motivation / reasons for change: Potential reasons for lean not being successful in the manager's department would be staff's reluctance to accept change.

**4.** Achievement of intended outcomes

Benefits: Benefits have been gained since the intervention. The biggest change, according to the manager, is the change of mindset amongst staff. They were initially resistive to change and closed to any suggestions but as the programme progressed they gradually became more open. The other benefit is the internal mail delivery system is speedier and efficiencies have been made in the sorting system of new post. This has introduced improvements for other departments, such as the planning department because deadlines have to be met and now targets are more achievable.

Productivity: Benefits have been made within the manager's department where there has been a change to the layout of desks to make improvements in the work flow. The manager will begin a new role in December 2008 to reorganise the way in which 'democratic services' are run and it will be carried out using lean.

Customer: Regarding changes being made for the customer, the manager reported that the internal postal system does not have any direct impact for the end customer. For the internal customer, it means a speedier delivery service, where he reported one may argue that by the planning department receiving their post quicker, it would mean the customer would get a better response time.

Senior Manager: Case Study 2

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager felt he knew 'quite a lot' about lean prior to the intervention. A previous Chief Executive of the LG authority struck up a relationship with Leyland Trucks who were using lean in their manufacturing process and he wanted to use some of their experience and introduce it into LG. As part of this move the manager was selected to visit Leyland Trucks to gain an understanding how they were using lean in their organisation. They were subsequently commissioned to carry out lean training for LG with an intention of lean being incorporated into their service. The manager feels some of the lean thinking remained in LG to some degree after the CEO left but it has since gained a renewed interest this time around through NEC. The manager saw this opportunity as a refresher because he felt he had forgotten a lot since his initial training. Senior management and the CEO was responsible for the decision to adopt lean following them receiving a committee report about efficiency and business improvement techniques. The purpose of adopting lean was to meet targets in accordance with the Gershon Report (2004) and the Comprehensive Spending Review (CSR 2007). The decision to use lean is part of a long-term plan. When asked how quickly the manager wants lean to bring about changes he replied he thinks the LG authority has obtained quick wins but it's also important for it to become embedded within the organisations' culture, which hasn't yet been achieved. He believes this should be carried out by the LG authority putting skills gained from the training to good use.

Expectations: Regarding the intervention meeting his expectations, the manager replied he thought the standard of the training was excellent although some of the content such as Health and Safety was unnecessary. It had exceeded his expectations in meeting any outcomes that were identified at the start of the programme. It had overall, been positive and a beneficial experience.

**2.** Appropriateness of the model

Model: The manager was asked if he had any views how the model could be improved for his department. He replied the amount of paperwork for the BIT / NVQ training got in the way of the actual training because it took away the emphasis of what was supposed to be delivered in terms of lean. The Health and Safety module was unnecessary as it is already part of statutory training within the LG organisation, therefore, more time could have been devoted to learning about lean and its techniques. The manager's opinion of lean prior to the intervention was he thought lean was more relevant in a manufacturing environment and it did not necessarily translate into a service industry. His opinion of lean has now changed due to the course and is able to understand how it can be adapted to suit any environment. The training course was helpful because it dealt with lean processes and practices rather than team structures that he had previously been taught.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content.

Easy to understand and apply: The manager felt lean was easy to use and apply which was made possible by the course leader providing everyday examples how lean can be used. This managed to reassure everyone as there was a lot of apprehension displayed by staff before the programme began. A brief history and philosophy of lean was given which helped to demystify it as well as making the concept real.

Areas that were difficult to understand / implement: There were no areas that were difficult to understand or use.

Change Agent: The manager though the use of an external change was vital and necessary for the organisation. When asked if the organisation was to carry out any lean activities in the future would he prefer them to be carried out in-house or by an external change-agent. He considered the organisation had received enough skills and knowledge to carry out lean themselves. There was no problem with there being no on-site lean team leader. He explained there was enough leadership within the group and from the tutors without having a member of staff taking leadership.

Diagnostic tool: A PNA was not discussed with the manager.

SENA: The manager was involved during each stage of the SENA process. His experience of the SENA was positive. He compared the way in which process mapping was delivered by NEC to how it can be delivered using a computer. He preferred the first method because it involved everyone in the group and the use of post-it notes made the process very visual and easily understandable.

Lean tools and techniques: relevance to task: The manager did not think there were any irrelevant lean tools or techniques which were taught during the intervention.

Effects on workload: When asked if any of the lean tools and techniques would be used in other areas of the manager's department he stated some of them had already been incorporated such as 5S and visual management. A third of the manager's team attended the training course and he felt this contributed to the rest of the team's enthusiasm to make improvements.

Usefulness: When asked which lean tools and techniques were useful the manager replied all of them were to some extent although he thought process mapping, visual management and understanding about waste were the most useful. He explained it is only when a process is mapped out that it is possible to understand how many stages are involved and where the various wastes are along the way.

Appropriateness: comparison to other models used: The manager has previously used another improvement technique entitled 'European Foundation of Quality Management' (EFQM), which he described as a business excellence model. When asked to compare lean with EFQM he stated both systems are completely different and have their place within the organisation. Whilst he considered EFQM to operate at a more strategic level and lean operating at departmental level he believed both systems are able to compliment each other very well.

Resources: The manager was asked whether the intervention had targeted the appropriate resources including staff and budget. He replied it is too early to predict although he considered the real benefits will be seen when virtual teams are set up from staff who attended the lean training. The intention is to look at processes throughout various departments in order to target the appropriate resources.

Departmental needs The manager thought the programme was relevant to his departmental needs because the department deals with value for money and lean can be used to identify savings and efficiencies.

Organisational needs: Lean fits in with the organisation's needs because the LG authority is seeking to become an exceptional organisation by meeting its priorities. Lean can therefore be used to reach the organisation's targets more quickly.

Customer needs: Lean has helped to meet customer's needs. The manager's customers are suppliers to the LG authority and for them it means they now get paid on time and are more willing to conduct business with the organisation. It is therefore a win-win situation for both parties.

**3.** Factors that may influence implementation success

Process: time: When asked if the during of the training was enough the manager replied he did not think it was whilst it contains the NVQ component. He stated two days were wasted due to paperwork that was required for the NVQ.

Resources and effects on productivity: The manager was asked what effects the training programme had on resources, such as staffing and productivity. He stated the short-term effect was

whilst staff were attending the programme it meant extra work had to be carried out by their colleagues.

Organisational culture: Lean fits in closely with the organisation's culture because it is trying to continually improve from being an excellent organisation to an exceptional organisation. When asked who will gain the most benefit from lean the manager replied the staff who attended the training would benefit because they would gain skills they previously did not have. The departments will in-turn benefit from the skills of its staff.

Senior management involvement: The manager attended all parts of the lean intervention.

Departmental staff involvement: Staff were selected to attend lean training through asking for volunteers. Most staff agreed to attend the training if there were insufficient volunteers.

Sustainability: organisational culture: The manager received both positive feedback and observed positive changes within the workplace. He explained on return to their department staff began tidying their workspaces and clearing corridors. Although he saw these as being small improvements he believed as time goes by there will be added momentum.

Training: When asked if there were any plans for further lean training the manager replied there will not be any more from external training providers although he saw there was a role for internal training. He believed the organisation should extend their knowledge beyond the 60 staff who are already trained in lean to the rest of the staff. This would mean some kind of additional training for staff to become lean champions or internal lean leaders. When asked what was going to happen with staff who have completed lean training the manager explained there was some uncertainty about this issue. His understanding was the LG authority will set up teams in order to carry on making improvements within the departments but no decision had been made where these will be. He believed there would be a resource issue around how many of the teams could be run at one time and the LG authority must be careful how it will be carried out.

Senior management: When asked what level of support was provided for staff attending the programme the manager replied good support was given by the corporate and senior management team. It was appreciated by them that it was inevitable there would be shortages of staff whilst the training was going on but they considered the benefits would soon out-weigh the shortfalls. The manager believed lean would become part of the organisation's strategic plan although no reasons were provided for this reason.

Future use of lean: Continuous improvement is already part of the organisation's strategy under the guise of 'Best Practice.' Lean contributes to this very well. Lean has not yet become part of the strategic plan. Lean is planned to extend into other areas of the manager's department.

Barriers: The manager was asked if there were any problems or barriers during the intervention. He replied he considered himself to be a barrier as he is a senior manager and was aware junior staff may be intimidated by such a role. During the initial stages of the training there was very little interaction from the group in terms of expressing their opinion, although as time progressed this soon changed. He added senior managers must be mindful not to dominate the group and let others make decisions. He believed there was good rapport amongst his training group. When asked if he was aware of any concerns raised from other members of staff taking part in the programme he stated there was an issue in one of the other groups. A departmental manager was reported to have taken things rather personal until it was pointed out by the NVQ facilitator that it was the process being scrutinised rather than the individual.

Resources: The manager stated the intervention had caused no unforeseen problems to the department. The main problems however, will be for senior management when discussing the 'car park' issues. These are described as problems that were identified by each training group but due to

the time element or complexity of the issue, it was necessary to pass these onto senior management for their attention and decision. As there were seven training groups involved in the interventions it means there could be numerous issues for senior management to address in the future.

Terminology: Terminology used in the intervention was not appropriate for the organisation where the NVQ facilitator was reported to use examples of lean from the manufacturing industry rather than LG. The manager recommends NEC should draw upon their experience from interventions with other LG authorities and also gain more understanding of how LG operates in terms of dealing with public money.

Motivation / reasons for change: When asked what reasons would the manager give for lean not being successful in his department he stated that he did not foresee any problems would occur due to the culture within the department. He could see a potential problem if staff was to return from their lean training and dictate changes should be introduced rather than making suggestions and discussing these with colleagues.

**4.** Achievement of intended outcomes

Benefits: When asked which areas had gained the most benefit from NEC the manager replied he thought most departments that were involved with the interventions had. He believed the real benefits are yet to be seen as it is still too early since the interventions took place. Changes have occurred within the workplace which has become tidier since the use of 5S. Changes regarding the customer were related to the manager's experience of the NEC intervention in his group. Benefits have been brought about for the customer where improvements have been made in the way suppliers are paid. The whole payment process has become more stream-lined.

Senior Manager: Case Study 3

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager did not know anything about lean prior to the intervention. The corporate management team was involved in the decision process to adopt lean. The main driver for change is due to the Local Authority's need to become as efficient as possible and because it is a public service there is an element of accountability. The manager believes efficiency is the main driver for change together with providing value for money. The decision to use lean is part of a long-term plan because the manager believes LG organisations are going to have smaller budgets whilst providing more services.

Expectations: The manager did not state how quickly he wanted lean to bring about changes although he explained some changes have already been introduced within a short period of time from the intervention so there is an expectation that subsequent changes can follow suit where possible. The manager did not have any expectations from the course because he was unaware what was required. However on reflection, he thought the course was useful in revealing where problems existed.

**2.** Appropriateness of the model

Model: The manager was satisfied with the model and could not suggest any changes how it could be improved for use in his department. The manger did not have any opinion about lean before the intervention but he now sees lean as being a common-sense approach.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content where the course focused on identifying customers and meeting their needs. He stated the course could have been condensed as it was too long and the gaps in-between each training session were also too long causing everyone to forget what they had previously learned.

Easy to understand and apply: The manager found lean easy to understand and apply and encountered no problems with the training. The intervention was spent looking at the process

where a planning application comes into the office and what happens to it during each stage until it is returned to the customer. The manager stated because he was already familiar with the process, he found this exercise simple to carry out but was uncertain whether he would feel as confident looking at another department's issue.

Areas that were difficult to understand / implement: The manager stated there were no areas that he did not understand although he could not see how the lean components and Health and Safety related.

Change Agent: The manager believes the use of an external change agent was useful because they brought in knowledge gained from experience with other LG authorities and they also added a challenging element to the intervention. When asked whether he would prefer any further lean training to be carried out in-house or by an outside change-agent the manager stated a consultancy would create cost implications for the LG organisation; although he felt confident staff had already been provided with necessary skills to carry out any changes in-house. There was no problem with there being no on-site lean leader as staff were provided with contact details for NEC and the NVQ facilitator came to visit the organisation on a weekly basis.

Diagnostic tool: A PNA was not discussed with the manager.

SENA: The manager was involved in the SENA. He described this experience as being useful and process mapping helped to identify areas of the planning process that could be reduced.

Lean tools and techniques: relevance to task: Health and Safety was seen to be irrelevant because it is already provided by the organisation as statutory training.

Effects on workload: Lean will continue to be used within the department. The manager believes process mapping is especially useful when reviewing each stage of the planning application process.

Usefulness: Process mapping was seen by the manager to be the most useful lean technique.

Appropriateness: comparison to other models used: The manager had not used any other improvement technique before lean.

Resources: The manager did not believe the programme targeted appropriate resources such as staff or budget and explained a criticism of his department is they are constantly under-staffed for the amount of work that comes in.

Departmental needs: The programme is relevant for departmental needs.

Organisational needs: Lean is appropriate for the needs of the organisation because LG organisations are required by Central Government to provide better services with less money so efficiencies have to be made.

Customer needs: Lean helped to meet customer's needs because the planning department can now provide quicker decisions for planning applications.

**3.** Factors that may influence implementation success

Process: time: The training programme was sufficient although the manager thought gaps in-between each session were too long because he believed there was a tendency for staff to lose momentum of what they learned.

Resources: The training programme caused problems for staff resources within the planning department. Half the staff attended the programme and they were expected to catch up on work on their return whilst striving to meet deadlines in accordance with Government legislation.

Organisational culture: Lean fits in with the organisation's culture because LG organisations are expected to be totally efficient and lean therefore meets their criteria. The manager believes the entire organisation as well as the end customer will benefit from lean because if processes are reduced then more time should be made available to concentrate on other issues.

Senior management involvement: The manager attended the entire lean training programme.

Departmental staff involvement: Volunteers were sought to attend the lean programme.

Sustainability: organisational culture: The manager stated he had not received any positive feedback from the training programme and added there was some frustration amongst staff because they had not yet received confirmation whether they successfully passed the criteria for the NVQ.

Training: The manager was uncertain whether there were plans for further training in lean. He believed it would be beneficial for the organisation to train staff into becoming lean facilitators so in-house training could be carried out in the future. When asked what was going to happen with staff who attended the training, he stated there was some suggestion of staff becoming lean champions.

Senior management: The manager was asked what level of support he provided staff who attended the programme. He replied everyone was supportive of each other in terms of preparing folders and completing tasks. He could not however provide additional support for staff who were left behind in the office. The manager is planning to use lean in other parts of the department such as continuous improvement. He also explained he is looking at the structure of the department based upon the principle of making efficiencies and streamlining processes.

Future use of lean: Continuous improvement is already part of the planning department's culture because they are required by Government legislation to constantly meet targets. The manager was uncertain whether lean had become part of the organisation's strategy because this report is released annually and nothing had yet been discussed at departmental level.

Barriers: When asked if there were any problems or barriers during the intervention the manager explained there was breakdown in communication where there was a failure to inform some heads of departments that the training groups were scheduled to conduct the 5S exercise in their service area. Another issue was the fact that people who attended the training programme were anxious about the amount of work they would face on completion of the training sessions. The manager stated some staff did not see the benefits of lean and thought it to be a waste of time.

Resources: The intervention had not caused any unforeseen problems to the department such as cost implications or staff issues.

Terminology: Terminology used in the intervention was appropriate for the needs of the organisation and all examples were sufficiently explained.

Motivation / reasons for change: When asked what reasons the manager would give for lean not being successful in his department, he replied staff became disillusioned about not hearing the outcome of their training which could impact upon any further training.

**4.** Achievement of intended outcomes

Benefits: The manager was asked which areas had gained the most benefit from the intervention where he replied it was beneficial to those who worked in the planning department. The

intervention allowed staff to analyse and scrutinise their processes and understand where improvements could be made in terms of becoming more efficient. Changes within the workplace were made which included the office becoming tidier and safer due to 5S being implemented; stages in the checking of documents had also become more streamlined where there was previously a lot of unnecessary duplication. Changes were made for the customer as a result of the intervention where they now receive a faster response to their planning applications.

Senior Manager: Case Study 4

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager knew nothing about lean prior to the intervention. The Corporate Director and members of the senior management team were involved in the decision process to adopt lean into the organisation. The purpose of adopting lean, according to the manager, was to review and modify processes throughout the LG organisation. It had been a number of years since any changes were made and there was previously insufficient time to review processes. The decision to use lean is part of a long term plan. The manager would like lean to bring about changes sooner rather later although she realistically cannot predict how long it would take. Each department is different and changes will occur at a various pace.

Expectations: The manager had no expectations from the intervention because she knew nothing about lean beforehand although it has since made her more aware of how the organisation needs to make improvements.

**2.** Appropriateness of the model

Model: When asked if the manager had any views about how the model could be improved for her department she replied the Health and Safety element of the course should be omitted due to it being already provided as statutory training. The manager had no opinion of lean before the intervention although by the end of the programme she could appreciate lean could bring benefits to her department and how it could be used by them in the future.

Opinion of each stage: The manager believes the information given at the beginning of the intervention accurately reflected the actual content.

Easy to understand and apply: Lean is easy to understand and use although it is not yet fully embedded within the department. 5S was used throughout the office and was enjoyed by all staff.

Areas that were difficult to understand / implement: There were no areas that were difficult to use or understand.

Change Agent: The use of an external change agent was effective for the organisation because it allowed the group to think about issues they would not otherwise be able to do if the programme was led internally. If any changes could be made regarding how the change agent led the programme she replied if they were to use the consultancy again she would prefer to focus on the task at hand rather than review lean in its entirety. If the organisation was to carry out further lean training the manager would prefer it to be led in-house because each department already knows its own processes. If a consultancy was to be used in the future she would prefer them to work along-side the LG authority, rather like NEC, instead of being told what changes they should introduce. There was no problem with there being no on-site lean leader because everyone knew how to contact NEC if they had a problem.

Diagnostic tool: A PNA was not discussed with the manager.

SENA: The manager was involved in all stages of the SENA. On describing her experience of the SENA she stated she was surprised how many stages were involved in the process of employing a

new starter. Previously, she thought the procedure was simple and straightforward but after process mapping it she realised how many delays were involved along the way.

Lean tools and techniques: relevance to task: Health and Safety was the least relevant lean technique on the programme.

Effects on workload: When asked if lean will be used in other areas of the department the manager replied it will be used throughout the LG organisation although it will take a long time to spread throughout the organisation. The LG organisation is looking to set up an internal group but it has not been communicated how this will work. Looking for volunteers will be difficult because everyone is so busy.

Usefulness: Process mapping and 5S were seen to be the most useful lean techniques.

Appropriateness: comparison to other models used. The manager has not used any other improvement techniques.

Resources: When asked if the programme had targeted appropriate resources including staff and budget she explained it was a pity the intervention with NEC was a one off and she would have preferred other staff to be trained by them within the organisation. She added 'if everyone was trained the same way in lean techniques then everyone would be able to use it in their own departments.'

Departmental needs: The programme is relevant to the manager's departmental needs. She explained staff do not have the time to look at ways of making improvements because they are too busy with their every day tasks. The programme gave her the opportunity to make this happen.

Organisational needs: Lean fits in with the organisation's needs because it is always looking towards providing value for money and striving to become an excellent organisation. The programme has enabled them to review their processes and make efficiencies.

Customer needs: From the manager's perspective lean has helped to meet the customer's needs. She sees the customer in this instance as being the employee. It has enabled them to provide potential employees with as much information as possible before they start work by the setting up of the new personnel department's web-link. A new system of dealing with mileage claim forms has been introduced to ensure staff receives their money more promptly.

**3.** Factors that may influence implementation success
Process: time: The duration of the programme is enough and it gives staff a good idea of what lean is all about.

Resources and effects on productivity: The manager was asked to explain what effects the training programme had on resources, such as staff and productivity. She explained it was difficult for her department because there were already staff shortages and staff who attended the training course were expected to catch up on their work at the end of the day. Extra pressure was put on departmental staff to carry out work in their colleagues' absence during the training programme.

Organisational culture: Lean fits in with the organisation's culture and she understands it is being carried out throughout the LG organisation. When asked who will gain the most benefit from lean the manager replied it would be the staff who attended the training programme because they will be able to return their workplace and make improvements. Benefits have been made in the manager's department because that was where the lean intervention occurred.

Senior staff involvement: The manager attended the entire programme.

Departmental staff involvement: The manager was asked how members of staff were selected for the lean intervention. She replied this was carried out by staff volunteers.

Sustainability: organisational culture: The manager has not received any positive feedback or observed any positive changes within her department because there is a shortage of staff and there has recently been a restructuring of roles.

Training: The manager is uncertain whether there are any plans for further training in lean. She stated that if the organisation was not going to continue with NEC then they should consider training staff to become lean leaders so lean training could be carried out in-house. The manager does not know what will happen with staff that has completed the lean training.

Senior management: When asked what level of support she provided staff who took part on the programme she replied they were given time to complete the course. The manager believes lean could be used strategically within LG.

Future use of lean: Continuous improvement is part of the organisations' culture. It is too early for the manager to say whether lean has become part of the strategic plan. She is uncertain whether lean will be extended within other areas of her department because this decision lies with senior management.

Barriers: There were no problems or barriers during the intervention. When asked if the manager was aware of any concerns raised from other members of staff taking part in the programme she replied there were concerns regarding how long staff was going to taken out of their workplace and concerns about their colleagues having to cover for them. The Health and Safety module was another concern expressed by staff.

Resources: The intervention has not caused any unforeseen problems to the department. It actually helped to make savings in time and money.

Terminology: The terminology used in the intervention was appropriate for the organisation and was explained in a way that was easily understood.

Motivation / reasons for change: Potential reasons for lean not being successful in the manager's department were described to be insufficient time to review the process.

**4.** Achievement of intended outcomes

Benefits: Areas gaining most benefit from the intervention were in productivity and the department. The group looked how to simplify and streamline the mileage claims procedure as well as improving the starters and leavers process. There are benefits for the customer, who in terms of the department, are new starters. The personnel department now ensure all new staff undergo a smooth process from enquiring about a job vacancy through to their first day at work.

Senior Manager: Case Study 5 (PILOT)

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager had some knowledge of lean before the intervention. He explained the Local Authority looked into using lean a few years ago under the leadership of a previous Chief Executive. He was interested in bringing in some lean techniques into the organisation as used by Leyland Trucks. Some ideas were used but the manager stated they did not develop any further as the CEO left the service shortly after and the Council was then required to meet a national LG scheme entitled 'Best Value.' Senior management was involved in the decision process to adopt lean. The senior management team has recently been re-structured and they have taken the initiative to adopt lean in order to make improvements from a customer perspective and make efficiencies throughout the organisation in line with legislation. This was

their main purpose. The manager believes it is therefore a combination of a new senior management team and a need to generate efficiencies and meet customer demand that has been a driver for lean. The manager believes the decision to use lean is part of a long term plan. He explains his reasons are the organisation has invested in training staff throughout the establishment as well as the need to meet Government targets.

Expectations: The manager would prefer lean to quickly bring about changes. He stated some of the lean training showed how savings can be generated straightaway even from small issues. Regarding lean meeting his expectations, the manager stated that they were surpassed because unlike other courses it provided a combination of theory and practice and demonstrated how changes can be implemented straightaway. He was pleased how lean enabled them to measure the differences that have been made through savings and improved services. The intervention exceeded his expectations because he thought the course facilitator was excellent in how the training was delivered. The training was adapted to suit the needs of the group who was, at times, quite challenging.

**2.** Appropriateness of the model

Model: The manager was asked if he had any views how the lean model could be improved for the department. He explained there was a lot of form filling required for the NVQ which got in the way of learning and this was a shared concern from the rest of the group. The Health and Safety module was a waste of time as this is provided by the organisation as statutory training. He suggested there should be more rationale behind which staff are selected to attend the training but appreciated the role of the challenger. He thought a challenger from another LG organisation could be beneficial or someone more in common with the issue being scrutinised. The manager previously saw lean as being relevant only in an industrial environment and considered it to be a system that 'cut to the bone.' Through the intervention however, his perception of lean changed and he now sees it as a way of tailoring it towards the customers' needs whilst remaining as efficient and effective as possible. He thought the programme was easy to understand and he now sees lean as being more flexible than he previously thought.

Opinion of each stage: The information given at the beginning of the intervention accurately reflected the actual content.

Easy to understand and apply: The manager found lean easy to understand and use and thought a lot of it was common-sense which was supported by tools and techniques which could be used practically.

Areas that were difficult to understand / implement: There were no areas the manager found difficult to use or carry out because the programme was explained very well.

Change Agent: He found the use of an external change agent to be useful because although they were course tutors they also acted in the role of challenger where they asked very basic questions about the department's processes. This caused the team to think about what they were actually doing and why. If there was anything the manager would change in the future he would prefer there to be some kind of external challenge to the event. The manager was asked if there were to be any lean training in the future, would he prefer it to be held in-house or by the use of an external change agent. He replied it would depend on the size of the process where if the issue was small then the training could be carried out in-house. If the issue was complex, then the use of an external change agent would be appropriate because he considers it beneficial to have a 'fresh pair of eyes' and obtain a different perspective. He considered the practicalities and cost of using an external change agent and thought it may not be possible to do this in all of the processes within the LG organisation.

Diagnostic tool: The manager confirmed a PNA was discussed with him although it was not completed. He found the document difficult to complete because it was a new process that he had

not experienced before. He explained it was difficult to use the term 'productivity' in LG terms and added 'it is difficult as a service, to categorise a member of staff as being an item of productivity.' He feels the PNA needs to be better explained and placed into better context for the needs of LG.

SENA: The manager attended the SENA and the rest of the programme. He described his experience of it as positive and useful. He thought it was useful to be able to see and move issues around on a large piece of paper and it also got the message across to everyone effectively.

Lean tools and techniques: usefulness: Process mapping was the most useful lean technique because it allowed the group to scrutinise why they were doing various aspects of the job. He also thought base-lining and measuring the improvements was also useful.

Relevance to task: All lean tools and techniques were relevant for the department.

Effects on workload: The manager believes the lean tools and techniques will be used in other areas of the department such as 5S. They have already been incorporated around the office where desk spaces are now clear and the stationery cupboard is tidy which makes finding things a lot easier. It has given everyone an impetus to maintain this long-term.

Appropriateness: comparison to other models used: The manager confirmed he had used an improvement technique in the past entitled EFQM (European Foundation for Quality Management). This was part of the department's planning process for several years and is still being used. He was asked to compare lean with this model and he believes lean compliments EFQM where it is used as a diagnostic tool to identify areas for improvement and he sees lean as being the next stage. He added once the areas for improvement have been identified then lean helps to generate those improvements and obtain the desired results.

Resources: The programme has targeted appropriate resources including staff and budget.

Departmental / Organisational needs: The manager considers lean to be relevant for the departmental because there is a need to encourage services to continually improve. He believes it fits in with the corporate agenda of what the LG organisation is trying to achieve.

Customer needs: Lean has helped to meet customer's needs and there is a new attitude of the organisation seeking ways to make service improvements for the customer. His department has since reduced waste in the form of omitting duplication from the administrative processes.

**3.** Factors that may influence implementation success

Process: time: The duration of the programme is enough but the manager thinks it could be condensed into perhaps four or five days. He suggests having a workshop together for all seven interventions would have been better before breaking up into smaller individual groups. This would enable staff to learn about the process together then spend more time during the activities.

Resources: The manager was asked to describe the effects of the training programme on resources and productivity. He stated it had an impact on his department because there were six members of staff out of eleven who attended the training programme. It was therefore sometimes difficult to cover some of the extra work as a result, although it was not a major problem.

Organisational culture: When asked who would gain the most benefit from lean the manager replied most people would benefit. This includes staff who attended the training, members on the agenda who would like to see improved services and efficiencies as well as the end customer.

Senior management involvement: The manager attended the entire programme.

Sustainability: organisational culture: The manager was asked whether he had received or observed any positive changes in the workplace. He stated the 5S exercise was completed in the accountancy department where they now perform 5S on a monthly basis. He reported the visual impact was 'inspiring.'

Training: There are plans for future training in lean but the manager considers it will be more likely for the organisation to make use of the existing skills obtained from staff that has already completed lean training. This will be cascaded down to other staff. He also thinks training staff into becoming lean champions would be beneficial so they could train new staff to develop lean skills and provide refresher courses for existing staff.

Senior management: The level of support that was provided for staff who took part on the training was made possible by allowing them to attend all parts of the course. Time was also given for staff to attend meetings and carry out activities that were part of the course requirements. The manager thought it was useful to be involved in the training programme as he gained first-hand insight into the level of commitment that was required from the course. He believes lean has become part of the organisation's strategic plan.

Departmental staff: The manager was asked how members of staff were selected for the lean intervention. He replied it was carried out by staff volunteers as this is the way in which the LG organisation operates. Volunteers were selected according to relevance and some were later nominated as challengers to the events.

Future use of lean: The manager states lean has become part of the organisation's strategic plan and the principles of lean will be used to help make the LG organisation more efficient and effective which is part of their priority. There are already plans for the organisation to identify other areas that could use lean and make use of the skills. The manager is aware the organisation wants to generate more money and is looking at areas where this may be possible, such as planning, housing, and business re-generation.

Barriers: The manager was asked if he was aware of any concerns raised from other members of staff taking part in the programme. He stated the programme had been really positive although there were comments made about the amount of paperwork that was required to be completed for the NVQ. He stated Health and Safety was seen as unnecessary. He added if there were any potential barriers in his department it would be communication and making staff realise it is the process being looked at rather than the problem being due to a member of staff.

Resources: The manager was asked whether the lean intervention had caused any unforeseen problems to the department such as cost implications or staff issues. He replied there was not although there was some initial resistance by a member of staff from the department where the intervention was taking place. This has now been resolved.

Terminology: The manager stated that the terminology used in the intervention was appropriate for the organisation. After the first session the group was given a glossary of terms to help explain some of the new expressions.

Motivation / reasons for change: When asked to explain reasons for lean not being successful in his department the manager stated the issues would be to communicate with staff and to change their way of thinking. He sees this as being a challenge in his department rather than a problem or an issue.

**4.** Achievement of intended outcomes

Benefits: The manager stated there were benefits brought about from the intervention. Savings had been made and the department is now able to review more processes and introduce further improvements and efficiencies. Changes made for the department included making efficiencies by

reducing processes in the Customer Relation Management System (CRM) system. This means a more streamlined and speedier front-line service. Time has been saved for front-line staff who were previously involved in duplicating administrative work. This also brought about making direct improvements for customers who now receive a prompt reply from the Street Scene Services.

Senior Manager: Case Study 6

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager had previously heard about lean but was unaware of its role. The decision to introduce lean into the organisation was made at senior management level where a corporate director was initially asked to investigate the benefits of lean. The purpose of adopting lean is to improve services for the customer and to make financial efficiencies. The main driver for change came from within the council at senior management level and the manager is not aware of any other LG authorities undergoing the same change. The decision to use lean is part of a long term plan because lean has been integrated within the strategy of the organisation to meet efficiencies by 2012.

Expectations: The manager would prefer lean to make quick changes and it has already addressed some of its challenges identified in the intervention. NEC met the manager's expectations where their role was to facilitate the groups by encouraging staff to identify problems rather than dictate what action should be taken.

**2.** Appropriateness of the model

Model: When asked if the manager had any views of how the model could be improved for her department she explained the model was not a problem but it was more of an issue of finding the time to look at the processes during their daily tasks. When asked about the manager's opinion of lean before the intervention she explained she had no prior knowledge of it but she now finds lean is appropriate within her department and the organisation because it ties in with the expectations of making savings and efficiencies. It also encourages staff to think about addressing the customer's needs rather than the customer fitting in with the way the organisation is run.

Opinion of each stage: The information given at the beginning of the intervention accurately reflected the actual content. She explained however, it would have been beneficial to receive information about the course requirements and background information of lean before the programme was due to take place. Additionally, some staff were told different things about the course so there was no consistency of information before hand.

Easy to understand and apply: The manager found lean easy to understand due to it being explained clearly by the course leader. The theory and practice of it was simple to understand and carry out.

Areas that were difficult to understand / implement: There were no areas the manager found difficult to understand or carry out.

Change Agent: The manager believes the use of an external change agent was effective and does not know whether staff would have been as open and honest if the programme had been carried out in-house. The manager would not change anything used in the intervention because everything was explained so well. If the organisation was to carry out lean training in the future the manager would prefer this to be held in-house because staff has now been given the knowledge and skills to take lean forward within LG. The lack of an on-site lean leader caused no problems and if there were any issues outside the training sessions, the group would meet and discuss them. Staff were issued with a contact number for NEC if there were any problems however.

Diagnostic tool: A PNA was not discussed with this manager.

SENA: The manager was involved in al parts of the SENA. The manager explained her experience of the process mapping exercise as interesting because she never realised how many stages were involved in any of the processes used within her department. She enjoyed mapping out each stage and identifying how much waste there was.

Lean tools and techniques: ease of use: The manage found process mapping to be the most useful lean technique because it allows staff to examine and understand what steps are involved in a departmental process.

Relevance to task: Health and Safety was seen by the manager to be irrelevant as it is already provided by the LG organisation as statutory training.

Effects on workload: Lean will be used in other aspects of the managers department where process mapping is starting to be used in order to assess which processes need to be made more efficient. It is also anticipated process mapping will help justify the need for improved technology within the department, where staff are currently returning to the office on completion of a task so they can discover what further work is required. The manager feels the use of palm-tops would improve the service where staff would no longer need to return to the office and she is hoping process mapping would help support this need.

Appropriateness: comparison to other models used: The manager has not used any improvement techniques before so is therefore unable to make any comparisons with lean.

Resources: The lean programme targeted appropriate resources because it has brought about changes within the department which are still being implemented.

Departmental needs: The programme is relevant to the departmental needs and it has helped to develop ways in which staff works.

Organisational needs: Lean fits in with the organisational needs and it has been incorporated within the corporate objectives.

Customer needs: When asked how lean has helped to meet customer's needs the manager explained there is now better provision of information due to the new web-site and improved telephone answering service. More time has become available for staff to spend time with customers.

**3**. Factors that may influence implementation success

Process: time: When asked if the duration of the training programme was enough the manager replied that it was too long. The course could have been condensed and elements such as Health and Safety could have been omitted. There were days when the course began late and finished early and gaps in-between the training events were also too long. The manager preferred to have the training events closer together because she found herself forgetting what had previously been taught and time at the beginning of the sessions was spent reviewing what the group had learnt. Time was wasted during the final day of training and it was spent reviewing everyone's files in preparation of submitting them for the NVQ.

Effects on productivity: When asked what effects the training programme had on resources such as staffing and productivity, the manager replied concerns had been expressed by other members of staff regarding this issue. Because staff was taken out of their department for the training, this put strain on their colleagues to carry out extra work and there was pressure placed on staff to catch up on work that had been missed whilst they were attending the programme.

Organisational culture: When asked to explain how lean fits in with the organisation's culture the manager stated that one of the values within LG is the customer focus which is supported by lean. The organisation is also seeking to strive towards excellence. When asked who the manager

thought would gain the most benefit from lean she explained it would be the end customer because that is who the organisation is there for. Staff within her department will be spending less time completing paperwork and allowing them to spend more time communicating with customers.

Senior management involvement: The manager attended all parts of the lean training programme.

Departmental staff involvement: Members of staff were selected to attend lean training through volunteering. The manager also submitted names of key members of staff within her department who she felt would benefit from the programme.

Sustainability: (organisational culture): The manager received positive feedback following the lean intervention where the new web-site has been praised in a national newspaper.

Training: When asked what is going to happen with staff who have completed lean training the manager explained there will be a ceremony for staff to receive their certificates and she plans to spread lean throughout her department using skills and knowledge of staff who attended the programme.

Senior management: When asked what level of support did the manager provide for staff who took part on the programme, she explained a lot of support was provided within the group and everyone was supportive of each other. She had to spend extra time away from the group by helping a fellow colleague who found certain aspects of the course difficult. Lean is planned to be extended throughout the manager's department where various aspects of their work will be examined through process mapping.

Future use of lean: Continuous improvement is already part of the organisation's strategy where staff is constantly looking at ways to make improvements within the service. Encouragement has always been there for to staff to think differently and contribute ideas to make improvements. The manager believes lean has become part of the organisation's strategic plan where she is aware it is being incorporated in the department's service plan.

Barriers: The manager was aware of some barriers during the intervention. She explained staff initially became quite upset and took things personally where they thought it was themselves being challenged rather than the process. Also, some members of staff did not know when to stop criticising a process in their role of challenger to the event, which caused an amount of friction amongst their colleagues. The manager stated she was aware of concerns raised from other members of staff taking part in the programme where staff commented they felt as though they did not gain much from the training programme because their department was not being used in the intervention.

Resources: The intervention caused no unforeseen problems to the department such as cost or resource implications.

Terminology: The terminology used throughout the intervention was appropriate for the organisation although some examples did arise from the manufacturing industry. These were however explained and put into a service sector context.

Motivation / reasons for change: The manager was asked to explain the potential reasons for lean not being successful in her department. She stated time would be the biggest issue for staff to get together and review their processes.

**4.** Achievement of intended outcomes

Benefits: Benefits in productivity for the pest control department were made by the group scrutinising each stage of their process and reducing waste in areas such as time and mileage. Changes within the workplace have been made where the amount of duplication involved with

paperwork has been reduced. There was a tendency for double bookings to be made before lean was introduced but this has since reduced due to staff now utilising the computer system for bookings. Benefits for the end customer have been made through better use of I.T where a new web-site has been introduced and provides clearer information about the pest control and canine welfare services. The telephone answering service has also been improved to provide more information about what the department can offer and it leaves clear instructions for the customer how to contact the service out-of –hours.

Senior Manager: Case Study 7 (PILOT)

**1**. Policy drivers and expectations from using lean

Policy Drivers: reasons for change: Not much was known about lean prior to NEC's involvement .Senior management was involved in the process to adopt lean and departmental heads of service were involved afterwards. The main driver for change was something which was discussed at senior level. The decision to use lean is part of a long-term plan and there are a lot of changes within the LG organisation which need changing.

Expectations: When asked about how quickly the manager wanted lean to bring about change the manager reported it depends on what part of the business is being reviewed, where some issues are more complex than others. The intervention exceeded the manager's expectations because her original thoughts were a couple of good schemes would come out of the training but there is now a good amount of enthusiasm throughout the LG organisation where staff are keen to bring about change. It is expected this enthusiasm will escalate as the pace of change gathers momentum.

**2.** Appropriateness of the model

Model: The manager did not have an opinion about lean before the intervention as she was not aware of it and did not have any expectations. As the programme progressed she became more impressed with what it could offer the service.

Opinion of each stage: With regards to the manager having any views of how the model could be improved for her department she reported there was perhaps a need to simplify it. The particular aspect mentioned was part of the PNA document which needs amending to suit their needs. Information given at the beginning of the intervention reflected the actual content.

Easy to understand and apply: Lean is easy to understand and use. Good examples were provided by the course tutors throughout the programme where they related to everyday situations.

Areas that were difficult to understand / implement: If there were any areas which were difficult to understand and implement they were 'thrashed out' in the group until everyone understood the meaning.

Change Agent: The manager believes the use of an external change agent was effective for the organisation. When asked if there was anything that could be changed she replied that on her course everything was fine. However, on other courses staff reported it would have been better to have the same tutors throughout the programme so they too could gain an understanding of the service and the LG authority. She also added all LG organisations work differently. The tutors were not from a service background and only understood the systems within the manufacturing industry. When asked if the organisation was to carry out any lean activities in the future and would it be carried out in-house or by use of an external change agent she replied they would use both. She explained the organisation is in the early stages of using lean at the moment but there is an expectation that any internal issues within a service should be carried out internally. Anything that requires resources from another department has to be formally discussed with senior management. Anything seen to be controversial and needs a lot of money or investment would involve lean consultants in certain stages of the programme in future. This would of course depend on the nature

of what is being looked at and the LG authority is seen to be open to the idea of using lean consultants or seeking a challenge from different departments within the organisation.

Diagnostic tool: The manager was asked to explain whether a PNA was discussed with her and this was confirmed to have taken place. She replied she was the only one apart from two other managers who was aware of it within the LG organisation. The document was not completed because the budgetary data was unavailable. Assistance within the LG authority was sought regarding the statistical data but this was not available either. When asked to explain her experience of the PNA she replied it was difficult to complete and was too in-depth. From her experience, she stated staff has difficulty in carrying out costing processes. A reason for this is information is not always available or it may be available at a more senior level within the organisation.

SENA: The manager was involved in the SENA. Her experience of the SENA was positive and reported that staff were enthusiastic. Everything was explained simply.

Lean tools and techniques: usefulness: Process mapping was the most useful lean technique being used. The manager found the techniques around 5S really useful which she considers can be used in any situation.

Relevance to task: There were no lean tools or techniques that the manager felt irrelevant.

Effects on workload: The lean tools and techniques will be used in the manager's department and all members of staff are expected to use lean. The manager's own department is Information Technology (I.T) and this department is expected to have the main lead in carrying out lean throughout other departments within the LG authority.

Appropriateness: comparisons to other models used: The manager has not used any improvement techniques before so it is not possible to make any comparisons with lean.

Resources: The intervention has helped to target the appropriate resources including staff and budget. The service also has mechanisms in place to manage resources and during the training one of these resources was to allow staff sufficient time to attend the programme.

Departmental needs: The intervention is relevant to the manager's departmental needs, which is I.T, because they are increasingly becoming more involved in the way how other departments change how they work. I.T is involved in helping departments change their processes and ensuring standardisation is achieved throughout the organisation.

Organisational needs: Lean is seen by the manager to fit in with the organisation's needs because it appears to have some very clear challenges in terms of saving money and the intervention has demonstrated how this can be achieved.

Customer needs: Lean has helped to meet the needs of the customer through the use of a web-site which has made customer experience of choosing and booking the venue easier. Time has also been freed up for the receptionist so she is now able to spend more time dealing with telephone and face- to- face enquiries.

**3.** Factors that may influence implementation success

Process: time: The manager feels the duration of the programme is enough for the training aspect although insufficient in terms of carrying the process forward, which is now the responsibility of the organisation.

Resources: When asked about the effects of the programme on resources, such as staffing and productivity the manager stated her department 'took a hit.' This was due to enthusiasm from other

staff having completed the programme. They contacted the I.T department to seek their skills in order to make changes within their own departments.

Organisational Culture: When asked who the manager thought would gain the most benefit from lean, she replied it would be the end customer. She used an example where if the LG authority makes financial savings, these will be passed onto the customer where there could be no increase in council tax.

Senior Management involvement: The manager attended all parts of the intervention.

Departmental staff involvement: The manager was asked how members of staff were selected for the lean intervention. She replied an email was received from personnel department informing her that the lean intervention was to take place. She was then asked to recommend staff within her department who she thought would be appropriate for the course. The manager selected staff to attend the course from those who had previously expressed a desire for training during their annual appraisal.

Sustainability: organisational culture: The manager confirmed she has received positive feedback and observed positive changes in the workplace. There is enthusiasm amongst staff who attended the programme. The organisation had previously been through a difficult time of change within the structure of the senior management team but lean managed to bring about a renewed interest amongst staff.

Training: There are plans for further lean training within the organisation but it will depend on what has been achieved with the current training. It will be achieved through staff wishing to attend training but the manager would prefer all of her team to take part.

Senior management: When asked about the level of support that was provided for staff who took part on the programme and how it was achieved, the manager replied sufficient time was provided to complete the tasks and it is something the organisation is taking forward. The manager believes lean has become part of the strategic plan but suggests it will be the Corporate Performance Management (CPM) team who could confirm this.

Future use of lean: The manager plans to extend lean into other areas of the department which will be carried out through base-line mapping the processes. She added there is already a programme to address this issue.

Barriers: The manager reported there were no problems during the intervention but stated she was aware of a few ‘heated discussions’ amongst other groups taking part in the programme. She felt this was inevitable but problems are soon resolved through discussion. When asked if there were any concerns raised from other members of staff taking part in the programme she stated Health and Safety was an issue. All staff receives statutory training in Health and Safety, so to spend extra time in this was seen as a waste. Some staff questioned why they needed to do an NVQ when they were already in possession of degrees and others thought the training was too long which they thought interfered with their jobs. The time span of each training session was found to be either too long or too short depending on the group taking part in the intervention. Sometimes there was not enough time to complete the activities during the training sessions and at other times the sessions started late and finished early.

Resources: The manager was asked whether the lean intervention had caused any unforeseen problems to the department such as cost implications and staff issues. She reported that as an I.T department they are always targeted by other departments in search of their help which impacts on their own work. It did not have a detrimental effect however.

Terminology: Terminology used in the intervention was appropriate for the organisation. If there was any manufacturing terminology used by the tutors as examples they would provide further explanation in a way to make themselves understood.

Motivation / reasons for change: When asked to explain any reasons for lean not being successful in her department the manager replied the 'pressures of the day job' is a problem where one must take time to stand back and look at a problem. She also sees this as being more difficult if it involves people on the front-line who do not have time to do this. A clash of personalities amongst staff refusing to work with each other can also be problematic.

**4.** Achievement of intended outcomes

Benefits: It is too soon to say which areas have gained the most benefit from the intervention because the LG organisation has not yet received feedback from NEC. Once this is received, the outcomes will be reviewed in order to make any further changes. Changes made within the workplace involved making a difference to the person responsible for booking the events and processing invoices. Time has been saved in her working day and a web-site has been set up to advertise the banqueting suite in order to attract more customers. Good relationships were built up within the team and staff became enthusiastic to return to their departments and make changes. The biggest improvement in terms of the customer is the web-site where they can go on-line and discover how the banqueting suite can be arranged for various events and what menus are available. They are now able to book on-line rather than by telephone if they wish, where time is therefore saved.

Senior Manager: Case Study 8

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager stated he knew very little about lean before the intervention although he had heard about some of the techniques such as 'kaizen' through attending management courses. It was the manager himself who was involved in the decision process to adopt lean. He heard about lean whilst he was attending a project and he later approached the LG organisation's senior management team for permission to introduce lean into the organisation, outlining its benefits. He managed to obtain their consent although the project is still in its early stage. The purpose of adopting lean is to examine current processes in respect of how these are delivered and to remove any unnecessary elements. The main driver for change is the LG organisation's Stepping Up' programme which has been launched to try and transform the way the organisation operates and delivers its services. The decision to use lean is part of a long term plan where the programme is expected to spread across every area of the organisation.

Expectations: When asked how quickly does the manager want lean to bring about changes he stated there is always pressure to make quick changes due to 'CSR 2007,' where the Public Sector is expected to make annual cashable savings and meet efficiency targets. Regarding NEC having met the manager's expectations he replied the lean consultant and course leader were very good where they tailored the training programme around the needs of the study group. As a team event NEC was a perfect enabler.

**2**. Appropriateness of the model

Model: When asked if the manager has any views how the model can be improved for his department, the manager replied the Health and Safety element should be omitted because it is already provided as statutory training. He also thinks the course should be longer for staff to learn more lean techniques appropriate to the departmental needs and to allow more time for senior management approval if any significant changes are to be introduced.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. When asked what was the manager's opinion of lean prior to the intervention he replied he thought it was just another manufacturing technique which was difficult to see whether it had any applicability for the LG organisation. He also thought the purpose of lean was to save

money and reduce staff although following the intervention he realised lean is concerned with making efficiencies within a process.

Easy to understand and apply: The manager considers lean easy to understand and use because it is based on common-sense where it focuses on identifying wastes within a process and eliminating them.

Areas that were difficult to understand / implement: The manager had no problems understanding and implementing lean, however some staff could not grasp the acronyms involved in the 7 wastes.

Change Agent: The manager thought the use of an external change agent was effective for the organisation and explained if the training had been led by an internal trainer then he doubted whether the same results would have been achieved. NEC facilitated the group by encouraging staff to identify and solve problems themselves. The manager was asked if the organisation was to carry out further lean training, would he prefer this to be carried out by an external change agent or in-house. He explained he would like to see a combination of both being used but the training provider would have to deliver a more condensed version of NEC's intervention in order for training to be delivered across the entire organisation. In order for this to be made possible, he would recommend the training should last one day. There was no problem with there being a lack of on-site lean leader because the training group were supportive of each other and made their own decisions.

Diagnostic tool: A PNA was discussed with the manager which he later completed. When asked to describe his experience of the PNA, he explained he found this was the most difficult process to complete from the intervention. He thought the meeting was useful however, where he was informed which information was required for completing the document and he then went onto use data from the department's business plan. The data was available but the manager found difficulty in understanding the relevance of the information which the PNA required. The manager felt the process mapping exercise was more beneficial than the PNA because it allowed the group to easily identify areas that needed attention and was more appropriate. He added the PNA did not add any value and he could see other managers being put off adopting lean when confronted by the PNA. He suggested if the PNA document was to remain part of the intervention then the form should be a lot more concise and request information relevant to the organisation. He recommended that instead of the PNA, there should be a short statement given by the head of the PSS department at the beginning of the lean intervention to inform everyone what the main issue was that required attention.

SENA: The manager attended all parts of the SENA and thought process mapping was beneficial. Although there were individuals in the group who were not from the planning department they found it easy to understand what the department was trying to achieve. By the end of the first session everyone in the group knew the process of a planning application and was able to contribute to the mapping exercise.

Lean tools and techniques: relevance to task: Health and Safety was the least relevant part of the intervention.

Effects on workload: Lean tools and techniques will continue being used in the planning department where stationery required to carry out process mapping is being purchased.

Usefulness: The manager thought the action plan which followed process mapping was useful because it provided a structure from which to work on the improvements. Everyone saw the benefits of process mapping.

Appropriateness: comparison to other models used: The manager has previously used another improvement technique called PRINCE 2, although it deals more with paperwork issues. The

manager predicts process mapping will be embraced by the organisation because it is a logical technique that helps to identify problems quickly.

Resources: The manager believes the programme has targeted appropriate resources such as staff and budget. He stated it is usually difficult to obtain financial support from senior management but process mapping helped to provide evidence that change was necessary. The example he used to support his theory was extra financial investment was necessary in the postal delivery service which would bring about benefits for services such as the planning department. There would be a reduction in the length of time planning applications were being handled.

Departmental needs: The programme is relevant to the departmental needs because the department and service are changing the way that services are provided in accordance with Government legislation. The whole purpose of process mapping is to examine the service from a customer's perspective and to deliver exactly what they need whilst maintaining efficiencies.

Organisational needs: The manager believes lean fits in with the organisations' needs because the Local Authority is focussed on making efficiencies in accordance with 'CSR 2007.' Lean obviously fits in with those objectives and that is why there is a growing urge to extend the use of lean throughout the organisation.

Customer needs: Lean has helped to meet customer's needs where the intervention was spent identifying the amount of contact time between the customer and the planning department. Changes have since been made to how the department operates.

**3.** Factors that may influence implementation success

Process: time: When asked if the duration of the training programme was sufficient the manager replied it either needs to be longer or changed. The Health and Safety element should be removed which would allow more time to be spent on process mapping.

Resources: The training programme did not have any effect on resources, such as staffing and productivity because the organisation already invests sufficient time for staff training. The only cost implications that have occurred are in the earlier postal delivery service.

Organisational culture: According to the manager, lean fits in with the organisation's culture where staff is expected to do more with less. When asked who will gain the most benefit from lean the manager replied the end customer would benefit the most because the reason behind the training programme was to identify what their needs are and for the department to deliver the service as efficient as possible.

Senior management involvement: The manager took part in the entire training programme.

Departmental staff involvement: Staff was nominated to attend the training programme where word has since spread throughout the organisation how beneficial it has been. There is now a waiting list for staff to attend further lean training programmes. There are plans to train thirty more members of staff within the next six months from across the organisation.

Sustainability: organisational culture: The manager stated he received positive feedback from the course and observed positive changes within the workplace. All staff who attended the course was very positive and it has made them think differently about the way they work. The working environment is tidier and more efficient where staff is still keen to make further improvements within the department.

Training: The manager would consider training staff into becoming lean leaders so further training could be held in-house. When asked what is going to happen with staff that have already completed the lean training, the manager replied there will be an event taking place in January where staff will

be awarded their training certificates. In the longer term, a review will take place to see whether staff already trained in lean can be used as a corporate resource to help support other services work towards lean.

Senior management: The manager was asked about the level of support he provided for staff taking part on the programme where he replied sufficient time was provided for them to complete the course. Continuous improvement is to become part of the department's strategy. The business plan is being reviewed and areas have been identified for change such as outcomes, objectives, milestones, costs and structures. The manager stated continuous improvement will have to become part of the transition because corporately everyone is looking at value for money and how efficiencies can be made long-term.

Future use of lean: The manager believes lean is becoming part of the organisation's strategy although the LG authority is avoiding the term 'lean' and 'kaizen' and is using the label 'value for money' instead. There are plans to extend lean into other areas of the department and because the training has already included staff from other service areas it will continue to spread.

Barriers: When asked if there were any barriers during the intervention, the manager stated the biggest problem was to organise the training sessions so that everyone could attend. There was some initial resistance from heads of departments who were reluctant to allow their members of staff time to attend the training programme, although when the manager explained to them what benefits could be brought into their department the issue was soon resolved. The manager is not aware of any concerns raised from members of staff taking part in the programme.

Resources: The intervention created cost implications which were for an earlier postal delivery service, although the benefits from this appeared to outweigh the financial outlay.

Terminology: Terminology used in the intervention was suitable for the organisation because the course leader used 'common-sense' terms and provided good examples.

Motivation / reasons for change: The manager stated lean would not be successful in the department or organisation if there was a lack of 'buy-in' from senior management. He stated problems would occur if they neither supported staff attending the lean training nor supported the actual implementation of the improvements.

**4.** Achievement of intended outcomes

Benefits: The planning department received the most benefit from the intervention where the biggest impact was in a faster turnaround of planning applications. This was made possible due to a change in the time the post arriving and there is also a change in the way planning officers work. The intervention focused on making improvements within the postal system, process of planning applications and office organisation. Changes have been made within the workplace where it is now a lot tidier and organised. Files have been sorted and arranged in a way that staff can quickly locate them and work areas have been cleared away. The biggest impact, according to the manager, will be when the office relocates the following year where it is expected for all departments to reduce their office space by 25%. The planning department has already achieved this objective through using 5S from the intervention. Improvements have been made for customers where planning applications are being dealt with more quickly and they are now being kept informed of their stage in the planning application process.

Senior Manager: Case Study 9

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The manager stated he knew very little about lean prior to the intervention. The decision to adopt lean was made at senior management level and they have incorporated it as part of their strategic policy. The purpose of the organisation wanting to adopt lean was to be able to identify waste and become more efficient. The Gershon report (2004) was

the main driver for change together with a need for the organisation to keep up with emerging trends. The decision to use lean is part of a long-term plan for the Local Authority where it is being slowly adopted throughout the service areas.

Expectations: The manager would prefer lean to bring about changes as soon as possible and he believes this is exactly what lean is capable of doing.

**2.** Appropriateness of the model
Model: The manager had no views how the lean model could be improved for the department, although he thought there was a lot of attention to detail and time involved with the process mapping exercise. The manager had no opinion of lean before the intervention but the programme made him realise it is a common-sense approach and how quickly it can bring about improvements. He stated however, that he did not like the term 'lean' because it could imply the wrong message to staff.

Opinion of each stage: The manager was satisfied the information given at the beginning of the intervention reflected the actual content. The main focus was to identify waste and eliminate it where necessary.

Easy to understand and apply: The manager found lean both easy to understand and use and considered it to be straight-forward.

Areas that were difficult to understand / implement: There were no areas of the intervention which the manager experienced any difficulty.

Change Agent: The manager thought the use of an external change agent was effective and there was nothing he would change about the way the intervention was delivered. He believed if the intervention was led in-house it would not gain the same impact because there might be a risk from staff resisting change in their working practices. He realised that having an external change agent caused cost implications but believed the benefits outweighed this drawback. The manager was asked if the organisation was to carry out lean training in the future would he prefer it to be carried out in-house or by an external change agent. He replied that he would prefer an external change agent because better commitment is obtained from all staff across the organisation with better results being obtained.

Diagnostic tool: A PNA was not discussed with this manager although it was the department's corporate manager who was involved in this process.

SENA: The manager was involved in the SENA stage of the programme although he was not present for all of the stages. He thought the process was useful and it made a big visual impact by illustrating where changes needed to be made. He explained it was a 'powerful tool.'

Lean tools and techniques: relevance to task: The manager stated there were no lean tools or techniques that were irrelevant for the departmental needs.

Effects on workload: The lean tools and techniques will continue to be used in the department.

Usefulness: The manager found process mapping was the most useful lean technique because it was helpful to examine various stages of work being carried out by the department.

Appropriateness: comparison to other models used: The manager stated he had not used any significant improvement techniques before but added the LG organisation has learned that technical models like ISO 9000 tend to get in the way of what the organisation is trying to achieve. Lean however, is a simple and straight-forward approach.

Resources: According to the manager, lean targeted the appropriate resources. He also stated services think they never have enough money and lean is useful in terms of identifying processes that are not necessary, which in turn frees up resources.

Departmental needs: Lean is relevant to the departmental needs.

Organisational and customer needs: Lean is relevant to the organisational needs and the manager explained it is particularly relevant now when budgets are more constrained. He added the focus of the organisation has moved towards understanding the customer's needs and lean makes this possible.

**3.** Factors that may influence implementation success

Process: time: The manager thought the length of the training was enough especially where everyone has limited time.

Resources: The training programme did not have any adverse effects on resources as it was only a three day event.

Organisational culture: Lean fits in with the organisation's culture very well according to the manager. He added the LG authority is trying to encourage team working and involve staff at different levels in the structure. The organisation is also focused on customer needs and meeting their expectations.

Senior management involvement: The manager attended all parts of the lean training programme.

Departmental staff involvement: The manager was asked how members of staff were selected for lean training. He replied key members of staff were selected from the CPM team and volunteers were requested from other departments using their service.

Sustainability: organisational culture: Customers will gain the most benefit from lean according to the manager. The CPM team are still working on actions identified from the lean intervention. The manager has received positive feedback from staff who attended the course and he is also striving to keep his office area tidy.

Training: There are plans to extend lean training across the organisation.

Senior management: When asked what level of support did the manager provide staff who took part in the training he replied everyone was supportive of each other during the course. The manager stated it was too soon to predict whether continuous improvement has become part of the organisation's strategy but everyone found the lean intervention to be useful.

Future use of lean: The manager stated lean had already become part of the organisation's strategic plan and it will therefore continue to be used within his department.

Barriers: When asked if there were any problems or barriers during the intervention the manager stated there was some initial concern from members of staff at the beginning of the training course.

Resources: The intervention had not caused any unforeseen problems to the department.

Terminology: Terminology used in the intervention was appropriate for the organisation. The only issue reported by the manager was his dislike of the term 'lean' as it could imply the wrong message to staff within a context of the organisation making 'budget savings.'

Motivation / reasons for change: The manager is very optimistic that lean will be successful in his department and across the organisation.

**4.** Achievement of intended outcomes

Benefits: When asked which areas had gained most benefit from the intervention, he replied it was the department. There was initial apprehension from staff at the beginning of the training course but this soon disappeared once process mapping got underway. It is too early to report of any changes within the workplace because the work is on-going. There are plans to continue with making changes identified from the lean intervention with a target set for April 2009. The department has also benefited from becoming more tidy and efficient through the use of 5S. Changes have been made for the benefit of the customer who are seen by CPM as services within the Local Authority. The CPM department will now respond to customer demand and move to a more supportive role.

**Departmental Staff**

Departmental staff who attended the interventions and NVQ training was interviewed separately following the end of the case study interventions. The number of participants available for interview was restricted by availability and opportunity as the study was only interested in those who had attended all parts of the lean interventions and NVQ training. Departmental staff representing case studies two and three were used as pilot studies to test the validity of the study where it became necessary to add extra questions in order to make the study more robust.

Departmental Staff: Case Study 1

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: When asked how much the participant knew about lean before the intervention she replied that she knew what lean was about and considered it to be a common-sense approach. She did not feel there was a need for change because the previous system was working more effectively although she could not provide any examples to support this comment.

Expectations: The participant could not answer how quickly she wanted lean to bring about changes but explained that all tasks should be prioritised and completed as quickly as possible. There was nothing the participant wanted to achieve prior to the lean intervention.

**2.** Appropriateness of the model

Model: When asked what the participant's opinion of lean was before the intervention she replied she did not have any opinion of it but sees lean as being a common-sense approach. She added it is something that should be used by all managers because a job should be about getting the task completed as soon as possible.

Opinion of each stage: The participant stated information was provided at the beginning of the intervention but nothing was provided before the course took place. She added she did not agree with a lot of what the tutors had to say although she could not expand on this comment. When asked which areas could have been improved she replied 'all of it' and 'the experience was dreadful.' She supported this statement by adding Health and Safety, 5S and form filling required for the NVQ were time consuming and unnecessary. Process mapping was the best part of the programme by examining what happens during each stage of a process. When asked what the participant thinks of lean following the intervention she stated that she 'detests it.'

Easy to understand and apply: The participant did not find lean easy to understand and use and stated she made her feelings known about this during the programme.

Areas that were difficult to understand / implement: The participant thought 5S and the entire BIT / NVQ process were unnecessary.

Change Agent: The participant did not think the use of an external change agent was effective for the organisation because no consistency was provided from the training provider and there was a

change of NVQ facilitator throughout the programme. There was no problem with having no on-site lean leader. She would prefer further lean training to be carried out in-house where she reported improvements have been made internally since the training event.

SENA: The participant thought this was the best part of the intervention which was useful. The group reviewed the postal process within the mailroom and how post was distributed across the organisation. Unnecessary parts of the process were removed following the process mapping exercise.

Lean tools and techniques: Process mapping was the most beneficial lean technique where it was used to examine various stages of the postal process from start to finish.

Ease of use and understand: In response to whether there were any areas of the intervention she did not understand the participant replied she did not like the 5S part of the training. She stated she lost interest and 'switched off.'

Relevance to task: The participant stated process mapping had been used within her department which was the most relevant part of the intervention. Health and Safety and 5S were the least relevant lean techniques according to the participant.

Effects on workload: The lean tools and techniques had no effect on the participant's workload.

Appropriateness: comparison to other models used: The participant had not used any other improvement techniques before but considered lean to be a common-sense- approach.

Departmental needs: Lean tools and techniques are appropriate for the participant's departmental needs and process mapping has already been adopted.

Customer needs: The participant did not believe lean had contributed towards meeting customer needs.

Workload: The participant believed lean could fit in with her workload.

**3.** Factors that may influence implementation success
Process: The participant felt she was part of the decision making process during the intervention and a suggestion which she made was later adopted.

Time: The participant thought the training programme was too long and could have been condensed. She explained it was a common occurrence where training would start late in the morning and finish early in the afternoon. The gaps in-between each training session were also too long.

Relevance to own workplace: The content of the programme was aimed at the right level for the participant.

Organisational culture: Lean has not made any difference to the participant's morale or her workplace. She does not believe anyone will receive any benefit from lean although she appreciated other staff may think differently as she considered herself negative towards the intervention. According to the participant, the reason for introducing lean into the organisation is to 'save money.'

Departmental staff involvement: The participant was made aware of the lean training through her head of department who asked if she would attend the programme. When asked to explain her feelings when informed she was to attend the training the participant stated she was enthusiastic because any opportunity to learn is good.

Sustainability: organisational culture: She did not feel lean had made any difference to her job however. Process mapping could help in other areas of her work because it allows staff to make aspects of their work more efficient.

Senior management: When asked what was the level of support senior management provided staff to attend the training she replied they were keen for staff to attend the lean intervention and provided encouragement.

Future use of lean: The participant was confident lean will continue to be used within her department because the organisation is keen to adopt new ways of working to make efficiencies.

Barriers: The participant could not think of any disadvantages of using lean. The participant stated lean had caused her inconvenience because she did not agree what had been taught and time spent away from her work meant she had to catch up later on. Adequate time and facilities were provided for the training. Aspects of training which the participant would change were to omit Health and Safety and 5S because she considered them as irrelevant. The participant did not appreciate the fact that the course leaders were from a manufacturing background because 'both industries are completely different.'

Terminology: Examples used in the training programme were irrelevant to the organisation because they were industry-based.

**4.** Achievement of intended outcomes

Benefits: The participant reported there were no changes made within the department and what was completed during the intervention was 'annoying and totally inefficient.' She explained the intervention was concerned with making changes from a Health and Safety aspect by unnecessarily shifting around equipment. No changes had been made in productivity or for the customer. There were no areas which received any benefit from the intervention according to the participant. Process mapping was found to be one of the good parts of the intervention.

Departmental Staff: Case Study 2 (PILOT)

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant knew nothing about lean prior to the intervention. He felt there was a need for change before the intervention because everyone was used to doing the same work for years and failed to question if it could be done any better.

Expectations: The participant wanted lean to bring about changes as soon as possible although he stated improvements would be made through continuous improvement. His experience of the lean intervention surpassed his expectations. When asked what he wanted to achieve before the intervention he replied to gain a better understanding of lean and see what changes could be implemented.

**2.** Appropriateness of the model

Opinion of each stage: The participant thought information given at the beginning of the intervention accurately reflected the actual content. The training course was tailor-made to suit the needs of the organisation. When asked if there were any areas of the course that could be improved, he replied Health and Safety should be omitted because the organisation already provides it as statutory training. The good parts of the training were process mapping and getting everyone together from across the organisation to get to know each other better.

Easy to understand and apply: The participant found lean easy to understand and use where process mapping was especially useful.

Areas that were difficult to understand /implement: There were no areas that were difficult to understand or use because everything was explained clearly.

Change Agent: The participant thought the use of an external change agent was effective for the organisation because if it was led internally then the same results would not have been achieved. If lean training was to continue within the organisation the participant explained he would like to see a combination of both an external change agent being used and it being led internally. This would depend on the complexity of the process being examined and it would therefore be more appropriate for an external change agent to help with this.

SENA: When asked to describe his experience of the SENA the participant explained it was very good and useful to know where all the areas of wasted time and non-added value were within the payment process.

Lean tools and techniques: Process mapping was the most beneficial lean technique used in the intervention where the participant saw it as the 'backbone' of it all. Once a process has been mapped out, everything else then falls into place.

Ease of use and understand: The participant found all lean tools and techniques easy to use and understand.

Relevance to task: Because it was not long since the intervention had finished it was impossible for the participant to explain if any of the lean tools and techniques had been used in other areas of his work. He was confident however that they would be incorporated within his workplace. The participant felt all the lean tools and techniques were relevant except Health and Safety.

Effects on workload: The lean tools and techniques had not made any effects to the participant's workload although he felt his work had been enhanced by it where he now questions and thinks differently about what he is doing.

Appropriateness: The participant had no experience of other improvement techniques so it was impossible to make any comparisons with lean.

Departmental needs: The lean tools and techniques are appropriate for the participant's departmental needs.

Customer needs: The use of lean tools and techniques has meant the payment of goods will now be quicker and more efficient.

Workload: The participant believes lean fits in with his workload because lean has allowed him to question various aspects of his work, especially through process mapping.

**3.** Factors that may influence implementation success

Process: The participant felt he was part of the decision process during the intervention where everyone participated equally and made their opinions heard. Senior staff that was in the training group were quite open to suggestions and were prepared to listen.

Time: The length of the training programme was enough but it could be shortened if the Health and Safety element was to be taken out. The participant preferred the course to have been more condensed.

Relevance to own workplace: The participant thought the training programme was aimed at the right level for both himself and his colleagues.

Organisational culture: The participant was asked if lean had made difference to his morale and his workplace. He replied it had given staff encouragement to make changes within their department with the knowledge that further changes are possible and will not be forgotten about. The participant believes it will be the end customer who will receive the most benefit from the intervention. The participant believed the purpose of introducing lean into the organisation was to improve service efficiency in line with Government legislation and to meet customer demand.

Departmental staff involvement: The participant was made aware of the training through his departmental team leader who asked him to attend the course. When asked to explain his feelings upon being told he was due to carry out lean training he explained it was a new challenge and a good opportunity to learn more.

Organisational culture: The participant believed lean had made a difference to his job and that of his colleagues in other departments. He stated lean could help him in other areas of his work where it is a matter of making oneself more efficient.

Senior management: When asked how senior management provided support during the programme, the participant explained there was no interference from them and staff were left to get on with it during work's time.

Future use of lean: The participant felt confident lean would be continued within his department which is IT and he believed its role was central to the future development of lean throughout the organisation.

Barriers: When asked what the participant thought were the disadvantages of adopting lean, he replied it would be a problem if a challenger to the intervention joined the group and had no knowledge of the job. The intervention had not caused any inconvenience for the participant. Enough time and facilities were provided for the lean training although it could have been condensed into a shorter period of time. The training was suitable for the needs of the participant.

Terminology: When asked if the terminology was appropriate for the organisation the participant explained there were some expressions and examples used from industry.

**4.** Achievement of intended outcomes

Benefits: Changes have been made within the workplace and workload where processes have been put in place to make the payment of goods more efficient. The participant stated the improved process has meant a reduction of 95% from the original time it took to make a payment. Benefits for the customer mean they will now be paid promptly. He also stated improvements have been made across the organisation due to the lean intervention. Good parts of the intervention were learning about new opportunities that lean could provide. Everyone in the training group was enthusiastic and keen to improve the way they worked.

Departmental Staff: Case Study 3

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant stated he knew the basic principles of lean prior to NEC's involvement. He felt there was a need for change before lean was introduced which took place at the right place and time.

Expectations: The participant would like lean to bring about changes as soon as possible but realised some projects are more complex than others and may take longer to achieve. He had no expectations of lean before the intervention. When asked what he wanted to achieve before the intervention the participant replied he wanted to learn the skills that came along with lean and obtain the NVQ certificate.

**2.** Appropriateness of the model

Model: When asked what he thought of lean before the intervention the participant replied he thought it 'made things a bit quicker but didn't measure the improvements.' He since realised lean is able to measure improvements and is easy for staff to quantify these changes.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. The course leaders were constantly seeking ways to improve the content of the training and meet the learners' expectations. When asked which areas could be improved he replied more time could be spent on learning about lean issues if Health and Safety was omitted from the course. Too much time and emphasis were spent on 5S and completing paperwork required for the NVQ folder. Lean has changed the way he thinks about it due to the improvements that were made during the intervention.

Easy to understand and apply: The participant found lean easy to understand and use.

Areas that were difficult to understand / implement: The participant found 5S was challenging where the group was required to tidy someone else's department.

Change Agent: The use of an external change agent was effective for the organisation because the consultancy were not involved with company politics. The participant would change the scope of the BIT programme because he believed it was trying to address the requirements of both service and manufacturing industries. The participant would prefer any further lean training to be conducted in-house and he believed there was a vested interest across the organisation for lean to work.

SENA: When asked to describe his experience of the SENA the participant stated he found the whole process was challenging and was the most intensive part of the course. Process mapping allowed the group to gain a better understanding of the business that they were not previously aware of.

Lean tools and techniques: The most beneficial lean tools and techniques were the process mapping and being able to define where the wastes lie within a process.

Ease of use and understand: The lean tools and techniques were easy to understand and everything was explained well. They were also easy to carry out.

Relevance to task: When asked which areas were not relevant he replied more time could be spent on learning about lean issues if Health and Safety was omitted from the course. Too much time and emphasis were spent on 5S and completing paperwork required for the NVQ folder.

Effects on workload: Some of the lean tools and techniques are being used in other areas of the participant's work and also in other departments. There are some on-going corporate projects where lean is being used to improve the electronic document system led by the I.T department. Process mapping is being used to assist the transition. The lean tools and techniques had not yet had any effect on the participant's workload.

Appropriateness: comparison to other models used: The participant stated he had no previous experience of any other improvement techniques although his department issue surveys to their internal customers every two years in order to gauge their satisfaction with I.T services. Respondents are asked to state what they would like to see improved or changed from the service.

Departmental needs: The participant considered lean tools and techniques to be appropriate for the departmental needs because it allows them to understand how other departments within the organisation work. This is important for the I.T department because its role is to be a supportive service.

Customer needs: Lean has helped to meet customer's needs because they receive exactly what they want and the department are able to provide a quicker service.

Workload: The participant stated it was too early to say whether lean fits in with his workload.

**3.** Factors that may influence implementation success
Process: The participant felt he was part of the decision making process and believed his opinions were valued.

Time: The participant felt the duration of the training programme was too long where some sessions started late and finished early and the breaks were too long.

Relevance to own workplace: The content of the programme was aimed at the right level for the participant where he felt comfortable with the whole process and was used to seeking improvements within his own department.

Organisational culture: When asked if lean had made any difference to his morale or that of his workplace he stated only three staff attended the programme but all of them enjoyed it and were enthusiastic. The participant believed the end customer would gain the most benefit from lean. For his department this meant other service areas seeking support from I.T. He believed the purpose of introducing lean into the organisation was to develop processes that had not been looked at for a long period of time and to increase a better level of understanding.

Departmental staff involvement: The participant was made aware of the training through his head of department who asked if he would attend the course. The participant was apprehensive about the training programme because there was no information provided prior to its commencement.

Sustainability: organisational culture: The participant did not think lean had made a significant impact to his job although he felt it helped to clarify issues within his department to enable them to be better equipped when facing new challenges and making improvements. He stated lean could help him in other areas of his work and also within other departments through having a better understanding of work processes. Standardisation of procedures will help any new staff joining the organisation and it will provide staff with empowerment to challenge decisions.

Senior management: When asked how senior management provided support for staff on the programme the participant replied they provided sufficient time for everyone to attend the course. They provided staff with empowerment to try out improvements and listened to any suggestions.

Future use of lean: The participant is confident lean will be continued within his department and there is commitment across all levels of the organisation for it to succeed. He believes lean will gather momentum throughout the LG organisation once results start to be realised.

Barriers: The participant stated it was too early to comment on any barriers to lean implementation. He stated however, there must be a commitment from everyone across the organisation in order for lean to succeed. The programme had caused inconvenience for the participant where he had to catch up on work that he missed from attending the sessions. The programme was also too long in the participant's opinion. There was sufficient time and adequate resources to carry out the training. He stated training would have been better if the course leaders has some prior knowledge of LG because it was evident their background was in manufacturing. Some of the training elements were not appropriate such as Health and Safety.

Terminology: Some terminology was used from a manufacturing context but this was later explained by the NVQ facilitators.

**4.** Achievement of intended outcomes

Benefits: The participant stated quite a lot of improvements had been made within the workplace. Relationships have been strengthened throughout the organisation where a better understanding of people's jobs has been obtained. Lean has also given staff a 'level of confidence.' It is too early to report of any changes to the participant's workload although he stated the intervention allowed staff to gain confidence and obtain skills to take lean forward within the workplace. Benefits for the customer have been made where they now receive a speedier and improved experience from the service. The best part of the intervention for the participant was the open interaction during the training sessions where everyone communicated and interacted equally well.

Departmental Staff: Case Study 4

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant had limited knowledge of lean before the intervention. The purpose of adopting lean was to speed up processes and provide a more efficient service.

Expectations: The participant would prefer lean to bring about change quickly as demonstrated during the intervention. It has met her expectations by making processes within her job more effective and streamlined. She wanted to build upon her existing knowledge of process mapping and learn about other lean tools and techniques prior to the intervention.

**2.** Appropriateness of the model

Model: The participant stated lean has helped to change her approach to the way she carries out her job. 5S is still being used in her department following the intervention.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. Everything was explained well by the NVQ facilitators and everyone knew what to expect at each stage of the course. The venue was unsuitable for the needs of the participant because it was situated a long way from the LG organisation's main building. This caused inconvenience because the training group had to spend time travelling back to their department from the training venue in order to carry out the 5S exercise. When asked what was good about the intervention she replied the whole of process mapping was interesting but felt the worst parts were Health and Safety and wasting a lot of time completing the paperwork required for the NVQ.

Easy to understand and apply: The participant found lean easy to understand and use once she became familiar with the symbols used to identify waste.

Areas that were difficult to understand / implement: There were no areas which were difficult to understand or carry out.

Change Agent: The use of an external change agent was effective for the organisation and it was beneficial according to the participant to have 'a fresh pair of eyes.' When asked if there was anything she would change about the delivery of the course she replied it would have been better to have more examples from LG organisations rather than the manufacturing industry. There was no problem with there being a lack of on-site lean leader as the NVQ facilitators left contact details. The participant felt confident the organisation could now facilitate lean being taught in-house which she felt was better than using an outside change-agent.

SENA: The SENA was a positive process for the participant.

Lean tools and techniques: easy to understand and use: All lean tools and techniques were easy to understand and use. Process mapping was the most useful lean technique.

Relevance to task: 5S was the least relevant lean technique where the participant could understand the theory behind the technique but questioned the practicalities of using quarantine areas within the department.

Effects on workload: Process mapping has already been used in the participant's department to review a new documentation system. She considers lean tools and techniques have the potential in the long term to have a positive effect.

Appropriateness: comparison to other models used: Apart from process mapping the participant had not used any other improvement techniques and was unable to make any comparisons.

Departmental needs: Lean tools and techniques are appropriate for the departmental needs apart from 5S.

Customer needs: When asked to explain how lean has helped to meet the customer's needs she explained in the future the impression given by the LG organisation to customers would improve. She stated it is important for local residents to have confidence in the council and are happy with the service they receive.

Workload: The participant believes lean fits in with her workload where she sees it being embedded into various aspects of her work and bringing about benefits if used effectively.

**3.** Factors that may influence implementation success
Process: The participant felt part of the decision making process during the intervention and thought everyone in the training group participated equally well.

Time: The length of the training programme was sufficient.

Relevance to own workplace: The content of the programme was relevant to the needs of the participant and her colleagues.

Organisational culture: The participant stated lean had not made any difference to her morale or that of her colleagues although it had given her confidence to continue using lean to address problems in the future. She believes lean will bring benefits for staff but it will be end customers who will gain the most benefit through improved services. She believes the purpose of adopting lean is in accordance with the Gershon report (2004) where the LG organisation is expected to improve services whilst making efficiencies.

Departmental staff involvement: The participant volunteered to attend the training programme after being made aware of it by her team leader. She was pleased to be nominated for the programme.

Sustainability: organisational culture: Lean has not made any difference to the participant's job although she remains confident it may do in the longer term. She does not believe lean can help her in other areas of her work as the policies and procedures within her department have already been reviewed using process mapping.

Senior management: Senior management provided support for staff attending the training programme. Her group was attended by her departmental senior manager on the first day of the programme and there has been a corporate group meeting held in August following completion of the seven lean interventions. Senior management are keen for lean to be continued throughout the organisation and are looking to set up teams of volunteers from staff who completed the training so processes can be reviewed in other service areas.

Future use of lean: The participant believes lean will be superficially used within her department although it will be adopted more at a corporate level. She stated lean is constantly been quoted by the Senior Management Team (SMT) in minutes from their meetings.

Barriers: The participant did not think there were any disadvantages of using lean other than needing time to complete the process mapping process. The programme had not caused any inconvenience for the participant. Enough time and resources were provided for the training although the venue was situated a long way from the LG organisation's main building. This caused inconvenience because the training group had to spend time travelling back to their department from the training venue in order to carry out the 5S exercise. The training was suitable for the participant's needs although too much time was spent on the last day completing paperwork required for the NVQ.

Terminology: Examples used in the training programme were industry orientated and were distracting for the participant. She stated the NVQ facilitators tried to relate them to LG although they did not always translate well.

**4.** Achievement of intended outcomes

Benefits: Changes were made within the Human Resource department following the lean intervention. There has been some reorganisation and re-location of equipment which saves staff time in their daily tasks. No changes have occurred for the participant's workload. Improvements will be made for the customer, who are seen by the department as existing staff and potential employees. The participant found it difficult to explain which areas had gained the most benefit from lean. The best part of the intervention was learning was made easier through practical training rather than theory.

Departmental Staff: Case Study 5

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant had previously heard of lean before the intervention but did not know much about it. Senior management were the ones who decided to introduce lean into the organisation. The purpose of adopting lean was to improve the business and make processes more streamlined and efficient. Its ultimate aim was to improve services for the customer. The decision to adopt lean is part of a long-term plan.

Expectations: The participant stated he wanted lean to bring about instantaneous results although he realised some processes take longer to improve due to their complexity. He did not have any expectations from the intervention and thought it would be difficult for changes to be introduced due to staff culture being quite resistive to change. He stated he was impressed and surprised how everyone was enthusiastic about the intervention.

**2.** Appropriateness of the model

Model: The participant had no views how the model could be improved. He could appreciate the benefits that lean could introduce into his department.

Opinion of each stage: The model was simple to use and well structured. The information given at the beginning of the intervention accurately reflected the actual content.

Easy to understand and apply: The programme was easy to understand and use although the process mapping required some time to follow.

Areas that were difficult to understand / implement: The participant found no areas difficult to understand or implement. He did state however, that the 5S exercise and Health and Safety aspects were a waste of time and inappropriate.

Change Agent: The use of and external change agent was effective for the organisation where the participant stated he did not think the organisation had the skills or commitment for this to be carried out internally. If the organisation was to carry out further lean training the participant thought there was now sufficient skills and commitment for this to be completed in-house. He stated, however that he would prefer training to be led by a consultancy although he appreciated it would incur a cost implication for the LG organisation. There was no problem with there being no on-site lean team leader.

SENA: The participant stated he enjoyed the SENA and process mapping was the best part of the intervention.

Lean tools and techniques: relevance to task: Health and Safety plus 5S were the least relevant lean tools and techniques. Process mapping will be used in the participant's department and across the organisation.

Appropriateness: comparison to other models used: The participant had not previously used any other improvement techniques so he was unable to make any comparisons with lean.

Resources: The programme had targeted the appropriate resources where the only incurred issue was staff time.

Departmental needs: The participant believed the programme was relevant to his departmental needs, which was front-office.

Organisational needs: Lean is appropriate for the organisation's needs because it needs to move forward in line with making efficiencies.

Customer needs: Lean has helped to meet the customer's needs. The participant stated communication with the customer had improved where they were better informed of what was happening with an enquiry. Because some aspects within the department had become more streamlined it meant process times for customers had reduced. This was especially pertinent for customers who were in receipt of State benefits.

**3.** Factors that may influence implementation success

Process: Too much time and emphasis was placed on the NVQ documentation. The participant thought the BIT / NVQ training got in the way of the real issue of learning and understanding about lean.

Time: The participant felt the duration of the training was enough although the gaps in between the sessions were too long. He preferred the course to be more condensed into perhaps a weeks' duration.

Resources: The training programme did not have any adverse effect on the participant's department as he was the only member of staff who attended from his work area.

Organisational culture: Lean fits in with the organisational culture with what it is trying to achieve. The participant thought the organisation and end customer would gain most benefit from lean. He added the organisation would gain most benefit due to cost savings and it would be easier for the LG authority to highlight departments that were not as efficient as others.

Departmental staff involvement: The participant volunteered to attend the lean training where his role was a challenger to the event.

Sustainability: organisational culture: The participant has seen improvements within the workplace. There has been an improvement in the management of processes which has freed up a lot of staff time.

Training: The participant is uncertain whether there are plans for further lean training although he stated he would be disappointed if the skills were not extended and offered to other staff. He thought it was feasible for the organisation to train staff into becoming internal lean leaders.

Future use of lean: The department has adopted lean to become part of its service plan.

Barriers: When asked if there were any problems or barriers during the intervention the manager explained there was a breakdown in communication where there was a failure to inform some heads of departments that the training groups were scheduled to conduct the 5S exercise in their service area. The intervention caused no unforeseen problems to the department.

Terminology: Terminology used during the intervention was appropriate for the needs of the organisation. Everything was explained well.

Motivation / reasons for change: The participant was asked to give reasons why lean would not be successful in his department. He replied it would not create a problem for front-office staff because they are enthusiastic and open to change.

**4.** Achievement of intended outcomes
Benefits: The participant did not know which areas had received the most benefit from the intervention but thought it was more likely to be back-offices rather than the front-office. He stated the front-office was already streamlined and did not need improving. A lot of changes had been made within the organisation such as streamlining processes such as the mail delivery service. Benefits for the customer have meant they receive a speedier service.

Departmental Staff: Case Study 6
**1.** Policy drivers and expectations from using lean
Policy Drivers: reasons for change: The participant had no prior knowledge of lean prior to the intervention. He did not think there was a need for change within the organisation because he considered the LG organisation to be progressive.

Expectations: The participant would like changes from lean to occur immediately as there have already been improvements from the interventions that have obtained immediate benefit. He stated 'short hits save money and time.' Changes that the participant expected from the intervention were to improve the billing system for kennelling and provide better information about their service.

**2.** Appropriateness of the model
Model: The respondent finds lean interesting and it can be applied to one's workplace to save money and effort. He feels confident to help colleagues in other departments achieve efficiency through his experience of lean to-date.

Opinion of each stage: Information given at the beginning of the intervention reflected the actual content and the course leaders explained throughout each stage what the group should expect to learn. There were no areas of the intervention that could have been better. Parts of the programme which were good included getting to know colleagues from other departments, gaining a qualification and knowing that customers were to benefit from any changes made by the group. The negative part of the intervention was it took up a lot of time from the working day. The participant believes lean is a good process to make savings in time and money.

Easy to understand and apply: Lean was easy to use and understand because the course paperwork was set out in a logical manner. The workbook was an essential part of the course.

Areas that were difficult to understand / implement: There were no parts of the intervention which were difficult to understand or carry out.

Change Agent: The use of an external change agent was both essential and effective. The participant believed the same results would not have been achieved if the training event was carried out internally. There was nothing the participant would have changed during the intervention although he stated it did take a while to get through the course due to the excessive amount of paperwork. There was no problem with there being a lack of on-site lean leader because contact details were provided by the course leader. If the organisation planned to carry out further lean training the participant would prefer it to be led internally as he thought everyone had been given the necessary knowledge and skills to take it forward.

SENA: The participant described his experience of the SENA as positive. The training group mapped out a process and identified which of them added any value for the customer. A second process map was completed where all the wasteful activities were omitted so that the group could work towards this ideal state.

Lean tools and techniques: Process mapping was the most beneficial lean technique used during the intervention. It helped to identify a process from start to finish and how it could help to make improvements through simple changes.

Easy to understand and use: The lean tools and techniques were easy to understand and use because the NVQ facilitator gave good explanation throughout the course.

Relevance to task: There were no lean tools or techniques which the participant found irrelevant.

Effects on workload: The participant has used 5S and process mapping within his department since the training event. He has reduced the amount of paperwork involved in a grants situation without it affecting the quality or value of the service.

Appropriateness: comparison to other models used: The participant has no experience of other improvement techniques and is therefore unable to make any comparisons with lean.

Departmental needs: Government legislation dictates that certain procedures must be followed and met within the participant's department. Lean tools and techniques help to meet these targets.

Customer needs: Improvements for the customer have been made possible by using lean tools and techniques where a better information service is provided.

Workload: Lean fits in with the participant's workload where his work is very process driven and influenced by Government legislation. There are strict financial controls and processes that must be followed along with audit trails. Lean helps to meet these constraints and make efficiencies within the processes.

**3.** Factors that may influence implementation success

Process: The participant felt he was part of the decision making process during the intervention and his opinions were valued. He stated the group was focused in achieving the same outcomes despite them coming from different service areas.

Time: The duration of the training programme was enough where the participant would not like it to be any longer or shorter. The gaps in-between each session were long enough for the group to carry out their tasks identified from the intervention.

Relevance to own workplace: The content of the programme was aimed at the right level for the participant because he stated he had no previous knowledge of lean.

Organisational culture: Lean has made a positive difference to the participant's morale where he now knows his colleagues from other departments a lot better. It has improved relationships throughout the organisation where there is better communication and rapport. He believes the public will gain the most benefit from lean. The purpose of introducing lean into the organisation was to reduce cost and improve services.

Departmental staff involvement: The participant was asked if he would attend the training programme. He was pleased when informed that he was to attend the training because he enjoyed a new learning experience.

Sustainability: organisational culture: Lean has made a positive difference to the participant's role. It has saved him time and made the department more efficient and organised. It has also provided him with a better working relationship with colleagues in other departments.

Senior management: Support from senior management was excellent where they attended some of the training sessions and provided time and resources for the events to take place.

Future use of lean: The participant is confident lean will continue being used within his department where improvements have already been made.

Barriers: The problem of using lean, according to the participant, is it is a time consuming process. He sees lean as being a group task rather than individual because of the challenging aspect of it. The only inconvenience caused by the training programme was the amount of time the participant spent away from his department. Enough time and sufficient resources were provided for him to attend the programme. The training was suitable for the participant's needs where he feels confident enough to continue using lean.

Terminology: Everything was explained well throughout the training course. There was some terminology used from manufacturing although it did not cause any problem.

**4.** Achievement of intended outcomes

Benefits: Changes have occurred since the intervention and include an improved payment system, better information of the services for customers and improved kennelling facilities. Efficiencies have been made in the participant's own department where he has used the principles of lean to reduce the amount of paperwork that was generated for issuing 'facilities grants' to the disabled. He stated benefits had been made across the organisation through the lean intervention. Good parts of the intervention were lean could provide a system which could be applied and demonstrated to bring about efficiencies and cost savings.

Departmental Staff: Case Study 7

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant knew nothing about lean prior to the intervention. He felt there was a need for change within the organisation where improvements were previously sought by senior management who did not know how to bring about change.

Expectations: The participant did not state how quickly he wanted lean to bring about changes although he mentioned some improvements had already taken place from the intervention. When asked what he wanted to lean to achieve from the programme the participant replied publicity for the banqueting suite was poor and was in urgent need of change.

**2.** Appropriateness of the model

Model: The participant did not want to attend the lean training because he felt it had nothing to offer him. He was pleased however that he did complete the course as he found lean made him think differently about his work.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content and it was easy to follow. There were no areas of the course that could have been better. He stated he was apprehensive about attending the course at first but he found himself enjoying it. He would now recommend other colleagues to attend lean training.

Easy to understand and use: The participant found lean easy to use although he found it hard to understand at first. It became easier to understand once the course leader gave examples relating to the group's department.

Areas that were difficult to understand / implement: The participant had initial difficulty in grasping the course work but overcame this once it had been explained in more detail.

Change Agent: The use of an external change agent was effective for the organisation and there was nothing the participant would have changed about how the course was delivered. There was no problem with there being a lack of on-site lean leader. If lean training was to be carried out in the future within the organisation the participant would prefer it to be carried out by an external change agent. He stated internally led courses tend not to be effective.

SENA: When asked to describe his experience of the SENA the participant stated it made him think about all the various aspects of his job that he had not done before. The group looked at processes and examined ways to improve their service. The experience was positive.

Lean tools and techniques: Process mapping and 5S were the most beneficial lean techniques used in the intervention.

Easy to understand and use: There were no areas of the programme that the participant did not understand. He found some areas easier to understand and use than others.

Relevance to task: 5S has been used in the participant's department where it is the most relevant lean tool and technique for him. The Health and Safety element had the least relevance for everyone as it is already provided by the organisation as part of statutory training.

Effects on workload: The lean tools and techniques have not made any impact on the participant's workload.

Appropriateness: comparison to other models used: The participant has no previous experience of other improvement techniques and is therefore unable to make comparisons with lean.

Departmental needs: Lean tools and techniques are appropriate for the participant's departmental needs and they have made his work easier to perform, such as 5S. They have also made improvements in the way bookings are made and invoices are processed.

Customer needs: Lean has helped to meet the customer's needs because it is now easier to book an event. A web-site has been introduced where various photographs are displayed to illustrate how the banqueting suite can be arranged for their requirements.

Workload: Lean fits in with the participant's workload where he stated it is the duty of everyone within the organisation to make improvements so that customer satisfaction can be obtained.

**3.** Factors that may influence implementation success

Process: The participant felt he was part of the decision making process and his opinions were valued.

Time: The duration of the training programme was sufficient and the gaps between each session were long enough to carry out tasks required for the qualification.

Relevance to own workplace: The content of the training programme was aimed at the right level for the participant although he was apprehensive at first.

Organisational culture: Lean has made no difference to the participant's morale or that of his workplace. He believes the Local Authority would gain the most benefit from using lean due to generating more income from the banqueting suite bookings. The purpose of adopting lean into the organisation is to make improvements in the way work is carried out.

Departmental staff involvement: His Head of Department informed the participant that he was to attend the lean training. He was apprehensive about attending the course and did not want to attend. He preferred there to have been some information about the course beforehand as it would have helped to reassure him.

Sustainability: organisational culture: Lean has not made any difference to the participant's job although he believes lean can help him in other areas of his job in the future.

Senior management: Sufficient time to complete the training was provided by senior management although the participant was disappointed they did not approach him or his colleagues for feedback about the course.

Future use of lean: The participant is confident lean will be continued within his department as they are always keen to make improvements in the way they work.

Barriers: The participant could not see there were any disadvantages of using lean and the training programme caused him no inconvenience. Sufficient time and resources were provided for the training event which was appropriate to the participant's needs.

Terminology: Terminology used in the intervention was appropriate for the organisation. All examples were aimed towards LG despite the course leader originating from industry.

**4.** Achievement of intended outcomes

Benefits: Changes have occurred within the workplace where it is tidier and better organised. Improvements have been made for the customer where information about the banqueting suite is now placed on the web-site and the booking procedure has been simplified. There have been no changes to his workload however. When asked which areas have gained the most benefit from the intervention he replied the entire system within the banqueting suite had improved. The good part of the intervention for the participant was that it had made him think differently about his work and how changes can be introduced. His working relationship with colleagues across the organisation had also improved since attending the course.

Departmental Staff (a): Case Study 8

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant had no knowledge of lean prior to the intervention. The participant thought it was necessary for the organisation to adopt lean because she believed there was always room for improvement. The programme allowed staff to review their processes and make improvements.

Expectations: The participant would like lean to bring about changes as soon as possible because changes were introduced immediately within the participant's training group. When asked how the intervention met her expectations, she replied it had exceeded them and she had since informed a fellow colleague who was due to attend another lean training event how impressed she was with the course. She did not like the Health and Safety element however, as she felt it was 'tedious.'

**2.** Appropriateness of the model
Model: Lean was new to the participant but she found everything that was explained during the intervention made sense.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. When asked if there were any areas of the intervention that could have been better the participant replied her group tended to change its mind a lot regarding which process they wanted to improve. Therefore, more control from the course leaders would have been appreciated as a lot of time was wasted. There was a constant change of NVQ facilitator throughout the training which was detrimental for the group. When asked what was good about the programme, the participant explained process mapping was useful because it allowed staff to think about what was involved during their work and how it was possible to make improvements. She did not enjoy the Health and Safety element and thought too much time was spent on 5S.

Easy to understand and apply: The participant found lean easy to understand and use.

Areas that were difficult to understand / implement: The participant stated there were no parts of the programme that were difficult although she preferred to spend more time on various elements of the course.

Change Agent: The participant thought the use of an external change agent was effective for the organisation and the same results would not have been obtained if the course was led internally. There was no problem with there being a lack of on-site lean leader. She would prefer further lean training to be led by an external change agent in the future but thought it would be financially feasible for the organisation to train staff into becoming lean leaders.

SENA: The participant's experience of the SENA was positive and she thought it was interesting to examine the various stages of a process within her department.

Lean tools and techniques: Process mapping was the most beneficial lean technique. It was achieved by looking at a process step by step in order to make it more efficient.

Easy to understand and use: The lean tools and techniques were easy to understand and use. Process mapping was quite awkward to grasp initially.

Relevance to task: Lean tools and techniques have not been used in other areas of the participant's department. Health and Safety and 5S were the least relevant lean techniques.

Effects on workload: Lean tools and techniques have changed the way in which work is carried out but has not made any great impact, according to the participant.

Appropriateness: comparison to other models used: The participant had not used any other improvement techniques and was unable to make any comparisons with lean.

Customer needs: Lean has helped to meet the customer's needs because improvements made within the reviewed process mean they now have a speedier service.

Workload: The participant believes lean fits in with her workload and will continue to be used in the future. She added the programme caused some upheaval because the techniques were new although she could foresee no further problems as staff are now more familiar with lean.

**3.** Factors that may influence implementation success

Process: The participant stated she felt part of the decision making process and her opinions were valued. She was familiar with the process but was aware not to dominate the rest of the group in their decision making process.

Time: The duration of the training programme was enough although the participant stated the gaps between each session were too long.

Relevance to own workplace: The content of the programme was aimed at the right level for the participant and her colleagues. She stated everyone took part in the programme equally well.

Organisational culture: Lean has helped to improved morale within the participant's department. Staff was previously fed up with post arriving late and the planning department is now a lot tidier and more efficient since the 5S exercise. The participant believes everyone benefits from lean because tasks are completed faster and customers now receive better service.

Departmental staff involvement: The participant was made aware of the training from her head of department who asked if she was prepared to attend the course. She was enthusiastic about attending the course as it was an opportunity to learn something new.

Sustainability: organisational culture: Lean has not made any difference to the participant's job. She believes lean can help her in other areas of her work because it helps to make staff think differently about what they are doing and make improvements.

Senior management: Senior management were supportive of the decisions made during the intervention. They gave quick approval for any changes to be implemented.

Future use of lean: The participant is confident lean will continue being used in her department provided the training is extended to other service areas. She added whilst there is an emphasis for the organisation to save money it will be used.

Barriers: The participant thought the lean intervention was time consuming and was not sure whether any further training would have the same impact if it was led internally. She was also uncertain whether it would receive the same support from senior management. The programme had not caused the participant any inconvenience. Sufficient time was provided for the training although the training facility was a little cramped for the amount of people attending the course. The training was suitable for the participant's needs although she stated that she was afraid of forgetting some of her new skills if they were not constantly being used.

Terminology: Some terminology and examples provided in the intervention came from the manufacturing industry and required explanation. The participant stated this caused some distraction to the content of the course.

**4.** Achievement of intended outcomes

Benefits: Changes have been made within the workplace. Mail is now processed immediately and distributed to other services areas such as the planning department. Benefits for the end customer mean that it is now possible for them to receive results of their planning applications on time. The area having received most benefit from the intervention is the planning department which has created a change to their working pattern. When asked what was good about the intervention the participant replied it was nice to have an outside change agent to carry out the training.

Departmental Staff (b): Case Study 8

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant stated although she was familiar with the term 'lean' she knew very little about it before the intervention. She thought there was a need for change within the organisation before lean was introduced.

Expectations: The participant did not state how quickly she expected change from using lean but explained every process is different. If a process is in dire need of change then there may be an expectation that lean could be used to make it more efficient. Her expectations from lean were for an improved and more efficient service.

**2.** Appropriateness of the model

Model: Although she had limited knowledge of lean before the intervention the participant stated her knowledge of it has since increased where she can use process mapping and identify waste within processes.

Opinion of each stage: No information was provided before commencement of the training programme so the participant did not know what to expect. She thought the course was going to be more intense and any issues arising from the intervention would be passed onto senior management for their attention. Requirements of the NVQ however, required staff to demonstrate how improvements could be made. She would have appreciated information about lean before, during and after the course rather than being issued handouts that went into her NVQ portfolio. This has since gone to the examiners and she has no reference of lean other than from memory. Good parts of the intervention were how it was delivered and the amount of time staff spent on tasks identified through process mapping. The worst part of the intervention was learning about Health and Safety.

Easy to understand and use: Lean was easy to understand and use.

Areas that were difficult to understand / implement: There were no areas of the intervention that were difficult to understand or use.

Change Agent: The use of an external change agent was effective and the only aspect requiring change would be to omit Health and Safety from the programme. There was no problem with there being a lack of on-site lean leader. If lean training was to occur in the future the participant would prefer this to be led internally as she felt staff had acquired necessary skills.

SENA: The SENA was facilitated very well and process mapping was easy to understand. Everyone was equally able to contribute despite some staff coming from other departments.

Lean tools and techniques: Process mapping was the most beneficial lean tool and technique.

Easy to understand and use: There were no areas of the programme that the participant did not understand. The lean tools and techniques were easy to use.

Relevance to task: Visual management has been used in the participant's department and she was due to use process planning within the immediate future. Health and Safety and 5S were the most irrelevant lean techniques taught during the intervention.

Effects on workload: Lean tools and techniques had not made effect on the participant's workload.

Appropriateness: comparison to other models used: The participant has no previous experience of any other improvement techniques and is unable to make any comparisons with lean.

Departmental needs: Lean tools and techniques are appropriate for the participant's departmental needs.

Customer needs: End customers will receive results of their planning applications more timely due to lean being implemented.

Workload: Lean fits in with the participant's workload and it will be incorporated within her work as part of continuous improvement.

**3.** Factors that may influence implementation success
Process: The participant felt she was part of the decision making process and her opinions were valued. Everyone participated equally well.

Time: The duration of the training programme was sufficient.

Relevance to own workplace: Content of the programme was aimed at the right level for the participant and her colleagues.

Organisational culture: Lean has not made any difference to the participant's morale although she was aware morale had improved within the mailroom as a result of the post arriving earlier. The end customer will receive most benefit from lean although there will be some gains for the organisation in terms of staff being provided with more skills and knowledge. The purpose of adopting lean is to give customers exactly what they want as efficiently as possible without paying for something that creates no added value.

Departmental staff involvement: The participant was asked if she would like to attend the training programme by her head of department. She did not know what to expect from the course but thought of it as a learning opportunity.

Sustainability: organisational culture: Attending the course has helped the participant obtain a permanent position within the organisation where she was previously on graduate placement. Her new position will allow her to use knowledge and skills obtained from the training course.

Senior management: Senior management provided good support for staff attending the training. They were willing to listen to any suggestions for change brought about from the intervention.

Future use of lean: The participant is confident lean will be continued within her department and there is an expectation it will spread throughout the organisation. Her new role will require her to use skills and knowledge obtained from the intervention.

Barriers: There are no disadvantages of using lean although the participant believes there may be a cultural expectation that lean should bring about immediate change. The intervention caused no inconvenience because she explained there is an expectation that staff should use time for training events. Enough time was provided for her to attend the programme and facilities were appropriate. The training was suitable for her needs although she did not appreciate the Health and Safety element.

Terminology: Some examples were used from a manufacturing context although the NVQ facilitator explained their meaning appropriately.

**4.** Achievement of intended outcomes
Benefits: Changes have been made within the planning department where it has become more organised and tidy. The postal delivery service has improved where service areas now receive their mail up to two hours per day earlier. Planners are able to arrange their workload around the post arriving and get on with other tasks. End customers can be assured they will receive results of their

planning applications more timely. When asked to explain the good parts of the intervention the participant stated there was excellent support from senior management which had impact on the training group. The entire intervention was excellent.

Departmental Staff (a): Case Study 9

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant stated he acquired a very limited knowledge of some of the lean principles obtained from previous employment. He believed there was a need for change within the organisation and the timing was right for lean to be introduced due to the changing role of Corporate Performance Management (CPM).

Expectations: When asked how quickly the participant would prefer lean to bring about changes he replied it would be more appropriate if changes were made because they were required to change rather than have a knee jerk reaction. He thought lean would take longer to implement throughout the Local Authority because it would require indoctrinating within the organisational culture. Before the programme began the participant wanted to streamline the process within CPM and avoid the frustration of constantly pursuing departments for data when deadlines were approaching.

**2.** Appropriateness of the model

Model: The participant stated he ha a positive opinion of lean because he has seen it used in action and it works. He considers lean to be a common sense approach.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. When asked what could have been better with the model the participant replied there was nothing he would have changed. He stated it would have been better for senior management to attend the whole three day intervention rather than dropping in on sessions. He explained a good part of the intervention was that training was held all at once and allowed staff to focus on critical issues. Being away from the workplace was good as it eliminated the opportunity to return to his desk in between sessions. The only negative part was not everyone could attend the entire three day event. The intervention helped to reaffirm the participant's views about lean and he considers it as a valuable activity.

Easy to understand and use: Lean is easy to understand and use. Everyone could understand the benefits of using it because staff were frustrated how many wastes were involved in their department and wanted more time to carry out other tasks.

Areas that were difficult to understand / implement: There was nothing difficult about the intervention.

Change Agent: The use of an external change agent was useful because of the credibility and expertise which the lean consultant brought. There was nothing the participant would change about the intervention and it was beneficial to have the same lean consultant carry out other interventions throughout the organisation. The participant believed this allowed the change agent to obtain a thorough understanding of how the Local Authority operates. There was no problem with there being a lack of on-site lean leader as contact details were provided. The participant would prefer further lean training to be carried out by an external change agent due to their objectivity and expertise. He stated however, the only disadvantage would be a cost implication. The participant felt confident to carry out lean activities in the future as he felt the group had received sufficient skills and knowledge from the intervention.

SENA: The participant's experience of the SENA was positive. It was good to review the current process and identify the amount of wastes. The process mapping exercise was a useful tool because it was visual and allowed staff to easily identify where improvements were required.

Lean tools and techniques: Identifying waste and process mapping were the most beneficial lean techniques.

Easy to understand and use: The lean tools and techniques were easy to understand and use. Everything was explained clearly.

Relevance to task: The participant stated since the intervention he has continued to identify wastes within his work area and customers are at the forefront of his mind. All the lean tools and techniques were relevant.

Effects on workload: Lean tools and techniques have not made an impact on the participant's workload although he is confident it will make 'massive' changes in the future once the review has taken place.

Appropriateness: comparison to other models used: The participant has attended training courses on benchmarking, target setting and business performance management in the past. He describes his experience of lean as a way of life and a change of approach in comparison to other models.

Departmental needs: Lean tools and techniques are appropriate for the departmental needs because they are used to help address the needs of customers. Lean helps provide a clear indication of what should be done and how resources can be adapted accordingly.

Customer needs: Lean has helped to meet the customer needs because it enabled staff to identify various wastes within the current process and how complicated their system was before. The new system is more streamlined and customer friendly.

Workload: Lean fits in with the participant's workload because it allows him to identify waste and he has become more challenging as a consequence. He believes this is a continual process where identifying waste will help him do more with his time once changes have been made.

**3.** Factors that may influence implementation success

Process: The participant felt he was part of the decision making process and his opinions were valued. This was due to the facilitation of the course leader and everyone participated equally well.

Time: Duration of the training programme was sufficient.

Relevance to own workplace: Content of the programme was aimed at the right level and was well delivered.

Organisational culture: When asked if the participant felt lean had made any difference to his morale or that of his workplace, he replied there is anticipation lean will make a positive change. Changes from the intervention will have positive impact for services throughout the organisation that use the facilities of CPM. Everyone will gain the same benefit from lean. The purpose of adopting lean is to work within available resources and ensure tasks are adjusted to need.

Departmental staff involvement: The participant was made aware of the training from his line manager and he was invited to attend. He looked forward to attending the course although he was initially concerned how time spent away from the office would impact his work.

Sustainability: organisational culture: Lean has not made any difference to the participant's job although he predicts improvements will be made in the future. He believes lean can help him in other areas of his work where he identifies wasteful activities within the department and is able to challenge whether efficiencies can be made.

Senior management: The participant was asked to describe the level of support from senior management during the training programme. He replied a director came along to the event which gave an indication there was commitment from senior management.

Future use of lean: The participant is confident lean will be used long-term throughout the organisation.

Barriers: The participant does not predict any disadvantages of using lean. The biggest issue is for the necessity of cultural change within the organisation so staff can adjust their way of thinking. It will be a challenge to stop and change the way work has always been done in the past to something new. The programme had not caused any inconvenience for the participant and enough time and facilities were provided. The programme was suitable for his needs but not everyone could attend the entire three day event.

Terminology: Examples and terminology used in the intervention were appropriate for the organisation. All examples related to LG.

**4.** Achievement of intended outcomes

Benefits: Very little has changed within the workplace as it is not long since the intervention took place. It has changed the way the participant thinks about his work where he is able to identify wastes within processes and is prepared to discuss them with his line manager. No changes have been made to his workload because the results from the lean intervention are still in the review stage. His predicts that his workload will reduce once changes are implemented however. When asked what changes have been made for the customer he replied that his department are now asking what they want. The department has become more conscious of the needs of the customer following the intervention. It was difficult for him to comment which areas gained the most benefit from the intervention although he was aware changes were occurring throughout the organisation as a result of lean. Best parts of the intervention were taking time to review what was wrong with the department's current process and staff designing an approach to eliminate waste and improve the service.

Departmental Staff (b): Case Study 9

**1.** Policy drivers and expectations from using lean

Policy Drivers: reasons for change: The participant had no experience or knowledge of lean prior to the intervention. She believed there was a need for change within the department as the current process was too complicated and time consuming.

Expectations: The participant would prefer lean to bring about quick changes because so much time is spent pursuing data throughout the organisation. The intervention has met her expectations. Before the programme she wanted to gain an understanding of lean and how it could help improve the service.

**2.** Appropriateness of the model

Model: The participant believes lean is a good model as it allows staff to work towards making improvements and the concept can be used immediately.

Opinion of each stage: Information given at the beginning of the intervention accurately reflected the actual content. It was clearly presented by the course leader. Staff interaction was good throughout the programme although the premises used for the programme was cold and uncomfortable.

Easy to understand and use: The participant found lean easy to use and understand because the programme was facilitated well. It was well presented and explained.

Areas that were difficult to understand / implement: There were no areas difficult to understand or use.

Change Agent: The use of an external change agent was effective because it was useful to have to someone with a 'fresh pair of eyes' who could provide a level of objectivity to the group. There was no problem with there being a lack of on-site lean team leader although the lean consultant appeared to spend a lot of time around the organisation being involved in other interventions. She would prefer further lean training to be carried out in-house as she feels staff have been given the necessary skills and knowledge to take this forward.

SENA: The participant's experience of SENA was positive where a current state and future state map were completed.

Lean tools and techniques: Identifying waste and process mapping were the most beneficial lean techniques.

Easy to understand and use: There were no parts of the programme which were difficult to understand or use although she stated it took a while to familiarise herself with the process mapping exercise.

Relevance to task: There were no lean tools or techniques which were irrelevant as the programme was tailor-made according to the needs of the department.

Effects on workload: Lean tools and techniques have not been used in other areas of the participant's work although it has made her more aware of the need to become more efficient through avoiding wasteful procedures. She anticipates lean tools and techniques will make an impact on her workload for the better once the intervention has been reviewed and formally implemented.

Appropriateness: comparison to other models used: The participant has no previous experience of other improvement techniques and is unable to make any comparison with lean.

Departmental needs: Lean is appropriate for the departmental needs because it identified a lot of areas which need improvement. It is appropriate for every area of the CPM department.

Customer needs: Lean will help to meet customer's needs where the department has already identified wastes within their process to make a more streamlined service.

Workload: The participant anticipates lean will fit in with her workload once it has formally been implemented.

**3.** Factors that may influence implementation success

Process: The participant felt she was part of the decision making process and her opinions were valued. Everyone contributed well during the intervention although there was a mixture of staff with varying levels of experience.

Time: The intervention was long enough for the needs of the department and the participant felt they were provided with sufficient information.

Relevance to own workplace: The programme was aimed at the right level for the participant.

Organisational culture: Lean has not made any difference to the participant's morale or that of her workplace although staff were enthusiastic about changes that could be introduced. The purpose of adopting lean into the organisation is to make better use of resources, reduce spending and make better use of staff. She believes its ultimate aim is to meet customer's needs.

Departmental staff involvement: The participant was made aware of the training programme through her head of department and she was required to attend. She was enthusiastic about attending the course where it would be beneficial for her personal development.

Sustainability: organisational culture: The participant is confident lean will be continued within her department because there is an expectation from senior management that it will be used throughout the organisation. Lean will improve her job in the future by freeing up time and allowing her to carry out other tasks. It will also improve customer's experience of the new CPM system used for collating data.

Senior management: Senior management were supportive of staff attending the course who also participated some of the sessions.

Future use of lean: The participant believes lean can improve other areas of her work in the future where it has already identified two processes within her department. She sees no reason why lean cannot be used to make further improvements.

Barriers: The participant does not believe there are any disadvantages of using lean although care must be taken to remain focused and improve aspects required by the customer. There may be a tendency by staff to become overboard and make unnecessary changes. The intervention caused no inconvenience for the participant and the amount of training was relevant for her needs.

Terminology: Examples and terminology were relevant for the department and the intervention was tailor-made to their needs. It was evident the change agent had sufficient knowledge about the organisation and it provided staff with confidence that he knew what he was talking about.

**4.** Achievement of intended outcomes

Benefits: No changes have been made within the workplace or to her workload as the intervention is still being reviewed. She anticipates changes will occur for the benefit of the department where work will become more streamlined. Benefits will be made for customers where the CPM system for collating data will be easier to use. It is too soon to state which areas have gained the most benefit from lean. The intervention was good because it allowed staff to actively participate. There was good representation of staff across the department.