LEAN IN SERVICE INDUSTRY

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ABSTRACT

Lean Manufacturing (also referred to as Lean) has traditionally been associated with manufacturing industries; lately many service industries have adopted the methodology with the aim of improving their processes and customer satisfaction. This study seeks to explore whether implementing Lean manufacturing principles in the service sector is feasible or viable and whether those organisations that have implemented these principles have gained from utilising the methodology. The qualitative approach was utilised to assess service organisations that have implemented lean manufacturing principles and the study revealed that although the methodology was designed for manufacturing industries, service industries could implement Lean principles as well, thereby gaining organisational competitiveness and increasing customer satisfaction.

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1 INTRODUCTION

Lean manufacturing was made popular after the book “The machine that change the world” by Womack and Jones was published. They explains how Toyota developed a production system that improves efficiency and increases their competitiveness using the Lean manufacturing principle Womack and Ross [1]. Liker [2] claims in his book that many organisations adopt Lean manufacturing principles to improve productivity. Womack and Ross [1] reviewed the history of the development of Lean manufacturing, primarily at Toyota, but did not explicitly indicate how to achieve the methodology Moore[3], Standards and Davis [4] . Other studies were completed recently by Standards and Davis[4], Liker [2], Womack and Jones [5]. Key points of emphasis emerging from the book by Standards and Davis[4] appear to be reducing process variability, reducing cycle time and above all eliminating waste in the manufacturing process and supply chain. Liker[2] focuses on management’s responsibility on Lean, making decisions based on long term philosophy even at the expense of short term financial goals. He also outlines that production levelling, standards, employee involvement and problem solving are the main aspects of Lean methodology. Womack and Jones [5] concur with Liker[2], and Standards and Davis[4] regarding placing the emphasis on Lean thinking throughout the organisation.

Toyota Production System (TPS) provide the basis of what is known as Lean thinking by Womack [5]. The development of this approach to manufacturing began after World War II, and was pioneered by Taiichi Ohno and his associates while they were employed by the Toyota motor company Womack[5]. Forced by shortages in both capital and resources, Eiji Toyota instructed his workers to eliminate all waste Piercy and Rich[6] . Waste was defined as anything other than the minimum amount of equipment, materials, parts, space and time which are absolutely essential to add value to the product Paper and Spedding [7] . The foundation of the Lean vision is similarly focused on the individual product and its value stream and to eliminate all waste in all areas and functions within the system.

The successes of Lean manufacturing principles were never questioned because Toyota had taken control of the market shares in automobile production as a result of these crafted principles. Studies by Standards and Davis[4], and Womack and Jones[5] reveal other organisations who have implemented Lean manufacturing successfully and gained a competitive advantage.

2 DISCUSSION

2.1 Lean Manufacturing Tools

Lean is the identification and elimination of process waste in order to maximise customer value Farrington et al.[8] . Allen and Laure [9] , and Bon and Rahman [10] outline seven forms of waste which must be identified and eliminated:

- Over production - producing products which customers do not require at that moment
- Defects - failure to conform to specifications or to customers’ needs
- Unnecessary inventory - too much stock which is not required for production or by the customer
- Inappropriate or over processing - unnecessary activities or features that do not benefit the customer
- Excessive transportation - unnecessary movement of material
- Waiting - failure to deliver products when needed downstream, employee idling or waiting for stock.
- Unnecessary motion - unnecessary movement by employees.

2.1.1 Value stream mapping

Value stream mapping provides a graphical flow of the process and supports the related value stream analysis tool. It also provides the scope for the project by defining the current and future states of the system. Moreover, it includes time diagrams and identifies process steps that add value as well as those that are non value adding. And, finally, it facilitates a communication flow from customer to supplier and a resource flow from supplier to customer Allen and Laure [9]. Both Allen and Laure [9], and Paper and Spedding [7] concur that a value stream map is essential for the identification of waste in the process; therefore, this Lean tool is extremely significant in yielding speedy results in the system.

2.1.2 Visual Management:

Visual management is essential for quick referencing work standards and creating a visual environment that supports safety and guides process activities. It includes 5s (sort, shine, store, standardise and sustain) activities for maintaining a clean and uncluttered work area Taghizadegan[11].

2.1.3 Error proofing:

Error proofing, a technique to reduce the likelihood of a damaging mistake, is a concept outlined by Womack and Ross[1] and identified as a Lean tool used by Toyota to ensure product quality within the process.

2.1.4 Quick changeover methods:

Quick changeover methods facilitate the reduction of lost time during product changes. This principle resulted from the concept of Single Minute Exchange of Die (SMED). This was considered to be impossible at the time, but Moore [3] assert that by having quick setup times, the need for batches is eliminated and less material is retained in the work in process cycle.

2.1.5 Standardised operation:

Standardised operations assist in organising and documenting the process so as to permit workers to effectively use material and machinery, resulting in a flexible work force which is cross functional within the organisation Moore[3].

2.1.6 One piece flow:

One piece flow production is designed to reduce the size of batches or eliminate batch processing in order to convey output to the customers more rapidly while total productive maintenance ensures that factory and equipment are available so that production and service are not interrupted by equipment breakdowns Levitt[12].

2.2 Lean in service Industry

Lean production in the service industry was advocated by Levitt[12] and Levitt[13] in their articles ‘Production line approach to service’ and ‘The industrialisation of service’ respectively. Since then there have been many attempts at implementing Lean in the service industry. Bowen and Youngdahl [14] state that Lean in service only started gaining momentum in the late 80s as a result of McDonald’s utilisation of the Lean production flow concept in order to meet their customer’s expectations and Taco Bell’s being recommended as an example of a Lean production line in the service industry by Psychogios et al.[15]. Piercy and Rich[6] outlined Lean as a concept comprising a set of principles, practices, tools and techniques which, when implemented by following a systematic approach, would improve resource utilisation, quality and delivery with respect to products and services.
In the early 1990s, Lean was successfully implemented in service industries such as banking sectors and public sectors, and even hospitals and airlines were adopting this methodology to improve efficiency within their organisations George[16].

It is a fact that some aspects of Lean manufacturing do not apply to all service industries; however, studies by Bowen and Youngdahl[14], Psychogios et al.[15], Allyway and Corbett[17], and Maleyeff[18] outline core Lean principles which apply to any industry, including service industries as: value - customer focus; identifying the value stream; establishing flow or continuous flow; implementing a pull system; and striving for perfection. Organisations can then transfer these principles to fit their environment and ensure compliance to other service standards. Maleyeff[18] further avers that many of the Lean manufacturing tools are recommended to service environments with the understanding that service industries vary in their mandate and that organisations have to apply tools that are suitable to their organisations, as they see fit. Some of the Lean principle tools which apply to service industries are the 5s methodology, 7 wastes of Lean and value stream mapping according to Piercy and Rich[6]. Allyway and Corbett[17], however, argue that there are more specific tools which apply to service as well as to manufacturing, such as: load balancing, complexity analysis, throughput analysis, touch time analysis, line balancing and functional analysis. Other tools such as Visual aid management and Just in time are also considered to be applicable for service environments, according to Liker[2]. It is therefore important for service industries to understand all these tools and to utilise them as they are required, just as is the case for manufacturing industries.

George[16], and Allyway and Corbett[17] report on companies such as McDonalds and Taco Bell who have implemented Lean principles and tools effectively and have gained a competitive edge and increased their productivity. The question is, can call service sectors implement Lean effectively to such a level that will increase their competitiveness and profitability? Applications of Lean in service industries is gaining momentum as there are currently more than 90 academic papers on Lean in service applications in the industry. However, some of these studies are contradicting since some argue that Lean cannot be applied effectively in service industries. Therefore, the focus of this study falls on assessing the implementation of Lean manufacturing principles and tools in service industries in order to establish whether they can be applied to service industries effectively and whether their implementation will result in increased competitiveness, just as it did in the manufacturing industries.

3 METHODOLOGY

A qualitative approach was used in an attempt to explore Lean implementation in service industries Leedy and Ormrod [19]. Many scholars have studied Lean implementation in service industries to date. Available literature was reviewed in order to investigate industries where Lean had been implemented successfully throughout the world. This analysis is considered to be limited in scope as we believe that there might have been other organisations that have implemented Lean practices but did not publish their results and therefore the researchers did not have access to those results. Nevertheless, an analysis of service industries that had implemented Lean principles was carried out and secondary data from literature was used to draw conclusions.

4 RESULTS

The results of the review on the application of the Lean principle in the service industry are presented in Table 1.

4.1 Lean in the Hospital Sector

Burgess and Radnor[20] in their study on evaluating Lean in healthcare, claim that Lean implementation at the English National Health Service has been successful and continues to be popular in English hospital trusts and also continues to spread. Burgess and Radnor [20]
Outline that Lean in healthcare has been studied by many scholars; since 2001 about 90 publications have been published on Lean in healthcare services. It is thus evident that Lean is being successfully implemented in health sectors. Burgess and Radnor [20] maintain that this success is due to the fact the Lean focuses on customer satisfaction and employee involvement which suits the culture of most healthcare services Aronsson at al.[21].

4.2 Lean in the Public Sector

Arlbjorn at al. [22] concur that Lean can be implemented effectively in the public sector just like in any other service industry even though this environment is more complex; its customers are more diverse and customer demands are often defined by different stakeholders such as experts, politicians and users. Therefore, despite Lean implementations being successful in public sectors organisational development and cost efficiency must remain the main focus. Pedersen and Huniche[23] assert that the success of Lean in the public sector is determined by the following factors:

- **Goals and values**;
- **Complexity and importance**;
- **Balance of power**;
- **Resource and capabilities**.

It is therefore important to ensure that these factors are considered in order to guarantee the successful implementation of Lean in the public sector. For an effective implementation, Radnor proposes the use of the house of Lean concept and also emphasises that the purpose of these Lean tools must be employed for assessment, monitoring and improvement.

Table 1: Review of Lean in the Service industry

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Author</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>Allway and Corbett[17], Burgess and Radnor[20], Aronsson et al.[21]</td>
<td>Successful implementation in Hospitals particularly in the USA</td>
</tr>
<tr>
<td>Public sector</td>
<td>Arlbjorn et al.[22], Pedersen and Huniche[23], Radnor[24], Drew and Bhatia[25]</td>
<td>Successful implementation after strategic direction from Top management</td>
</tr>
<tr>
<td>Food</td>
<td>Bowen and Youngdahl[14], Kundu et al.[26], Manohar[27]</td>
<td>Problem during initial implementation; however, improved after review of some Lean tools</td>
</tr>
<tr>
<td>Airline industry</td>
<td>Bowen and Youngdahl[14], Parast and Fini [28], Rhoades[29], Tiernan[30]</td>
<td>Successful implementation with good rewards</td>
</tr>
<tr>
<td>Financial sectors</td>
<td>Allyway and Ahlstrom[31]</td>
<td>Successful implementation in many insurance companies</td>
</tr>
<tr>
<td>Education</td>
<td>Comm and Mathaisel[32]</td>
<td>Successful implementation with challenges on implementation strategy.</td>
</tr>
</tbody>
</table>
4.3 Lean in the Food Sector

Lean can be applied effectively in service sectors focusing on food. Although this industry uses its own standards, Lean principles can still apply. McDonalds and Taco Bell are said to be amongst the first service industries to utilise Lean manufacturing principles Bowen and Youngdahl[14]. Bowen and Youngdahl [14] argue that these organisations have implemented the production line concept in their food service industry with the aim of improving customer satisfaction and efficiency.

4.4 Lean in the Financial Sector

Financial sectors have also implemented Lean successfully, particularly in call centres. Studies by Ahlstrom[31] indicate how financial sectors have implemented Lean principles and tools purely in call centres. Financial sectors such as banks, and insurance and revenue services can utilise Lean principles effectively and gain substantial benefits; the major benefits being improved efficiency, deduction of costs and improved customer satisfaction Ahlstrom[31]. The concepts can be applied to any industry with a call centre, thus, industries such as telecommunications can utilise these principles at their call centres and reap the rewards. Lean can also be applied to improve organisational processes internally in financial sectors. Maleyeff[18] avers that Lean tools and principles can be utilised to improve internal systems within the organisation, thereby increasing the organisation's efficiency and profitability.

4.5 Lean in the Airline Industry

Quality service in the airline industry is an important driver for success and profitability. Parast and Fini[28] maintain that the profitability of the airline industry is determined by labour productivity; therefore, there is a need to ensure that productivity is always at the desired level if the airline industry is to be profitable. Lean principles and tools can be used to improve productivity, thereby also improving profitability Parast and Fini [28]. Airline service quality has been a focus for many years now, with airlines focusing on customers as their main objective for improving profitability. Airlines such as Southwest airline have implemented Lean effectively and are subsequently reaping the financial benefits Comma and Mathaisel[32].

4.6 Lean in the Higher Education Institution

A study conducted by Comm and Mathaisel [32] on Lean and assessing the best Lean sustainability within higher education forms the foundation of Lean in higher education institutions. Institutions that are forced to implement cost reductions or containment were initiated in the USA in order to improve the sustainability and effectiveness of higher education institutions Comm and Mathaisel[32]. Effective implementation of lean principles in higher education depends on the following aspects, according to Comm and Mathaisel[32]:

- **Educate employees on Lean concepts;**
- **Apply Womack Lean principles;**
- **Define appropriate metrics for success; and**
- **Continue developing outsourcing, collaboration and technology initiatives.**

Comm and Mathaisels[32] state that if higher education institutions can define values, map processes, eliminate waste and reduce flow by applying Lean principles, then the institution will define its niche and be able to provide a product second to none to meet the demands of its students. Administrative and academic processes could be developed to deliver efficient and cost-effective services to students, thereby increasing value. Processes could be streamlined and waste could be minimised by tapping into the resources at their disposal, particularly those from specialised niche professors. Lean in higher education can be implemented effectively, particularly if the focus falls on the principles and tools, and the
application of these tools focus on problem solving and improving customer satisfaction Comm and Mathaisel [32].

5 CONCLUSION

Lean manufacturing principles and tools were found to be applicable in the service industry. Although in some service environments some Lean tools had to be adjusted Ahlstrom [31], applying these tools results in the organisation improving its efficiency and effectiveness. The application of Lean in the service industry has been studied by many scholars and the following scholars concur that Lean applications in this industry is realisable, regardless of the nature of the service rendered, customer satisfaction or financial return Piercy[6], Bowen and Youngdahl[14], Allyway and Corbett[14], Burgess and Radnor[20], Aronsson et al[21], Arlbjorn [22], Radnor[24] Kundu and Manohar[27], Ahlstrom[31], Piercy and Rich[33]

The results indicated that different service industries have attempted to implement Lean in their organisations. Although this analysis is limited in terms of the number of organisations and quantification of financial returns, it shows that various service industries such as hospitals, Finance and higher education have utilised the principles and tools to increase their competitiveness.

It is evident that Lean in higher education has not made the same inroads as other sectors; the reason being that higher education institutions are not knowledgeable about Lean concepts although they utilise similar tools to maintain efficiency and effectiveness but these are not termed Lean initiatives. They also have complex customer and stakeholder relationships which makes the implementation of Lean more complex. With this in mind, the next research area should focus on how Lean tools can be adjusted to suit all service environments, particularly in higher education institutions.

6 REFERENCES


