

# A CRITICAL REVIEW OF LEAN PRACTICES ON FIRMS' PERFORMANCE

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## Abstract:

Lean implementation can typically be classified as efforts aimed at reducing waste to lower costs, increasing sales margins, improving resource efficiency and thus improving the company's profitability. Reduction of waste may include improving inventory management policies, closing unprofitable stores, maximizing the use of store space in stores to concentrate on more profitable products, improving employee skills, improving transportation and logistics efficiency and preventing faulty goods. This paper attempts to summarize the findings from various studies regarding lean practices and firm performance. The main objective of this study is to critically review previous studies on the effect of lean practice and firm performance. The researchers were able to review about 20 articles related to the topic of discussion. Lean practices from the theoretical perspective offers massive benefits and opportunities for all enterprises who have adopted it, including construction firms. Many of the past studies reported that lean practices positively impact on firm's performance. However, the study finds out that construction firms need adopt lean practices in their line of business operations for them to remain profitable and increase performance, especially in terms of delivering customer value, minimizing cost, completing the project on time as these positively affect their performance in a competitive market environment. And thus, the paper concluded that based on the positive impact of lean practices on many firms, construction firms in Kingdom of Saudi Arabia should strive toward adopting it in their lines of business operations. At the same time, more work should investigate the specific influence of lean practices in order to provide in depth knowledge on the issue concerned.

**Keywords:** Lean practices; customer value; time effectiveness; operational cost.

## 1. INTRODUCTION

One of the practices that gained a lot of popularity and recognized as strategic means that can enhance firm quality, productivity and related performance indicators is the lean practice (Karim, 2009 Sarhan, Xia, Fawzia, Karim & Olanipekun, 2018). The main objective behind lean practice is to eradicate waste that is actions that do not add any value to the client and raising efficiency of the construction firms (Issa & Salama, 2018). There are several kinds of lean practices which include waiting, moving products, equipment, over production, inventory, defects and extra processing (Banawi & Bilec, 2014).

Similarly, the concept of lean practices have promoted project efficiency by mitigating waste involved (Al-Sudairi, 2007). Perera (2013) argued that the overall performance can be enhanced through adoption of lean practices on vital areas. Fatima & Ahmed (2005) opined that it was realized that the industrial section was at infancy level of

development, it should move fast to advanced quality management concepts of Kaizen and total quality management so as to maintain its competitive advantage in an environment that will soon be fully liberalized. According to Gašparík, Gašparíková, & Ellingerová (2014), the global competition requires an outstanding degree of the quality achievement in the firms in order to satisfy customers.

Understandingly, the construction sector has evolved from time to time because the world is ever changing, and the efforts associated with the industry will also change. The technology has of recent years impacted greatly the construction industry and most of these firms under this industry have adopted the new technology in delivering their services to the people (Havensid et al., 2019). The technology has fastened the delivery of these duties and hence shortens the time to which these construction projects are being delivered and has also improved on the quality of the outcome that the projects have produced in the end.

The Lean Practices and Total Quality Management (TQM) concepts were developed due to the rise in the world competition (Alič, 2014). According to Gašparík, Gašparíková, & Ellingerová (2014), the global competition requires an outstanding degree of the quality achievement in the firms in order to satisfy customers. Additionally, a quality management practice will have a positive impact on the organization's performance and also have an influence on the returns in terms of profits; this is because TQM focuses on maintaining as well as improving the quality of the product as well as the performance of the business (Gašparík, Gašparíková, & Ellingerová, 2014).

A lot of companies are working day in day out just to be able to improve their performance in any possible manner. The most successful ones are those that always venture into innovation and obtaining as well as strengthen performance. The management's concern in every organization is the assessment of the organization's performance (Renner, 2011). For the practicing managers in every firm as well as the scholars, the measurement of the performance of these firms in the current economic world has proved to be the most critical factor. For profitability purposes, organizations should have at their fingertips their organizations performance at every level of the management. It is for this reason that these organizations have taken into place the lean practices total quality management that will enable them to have the upper hand when it comes to having a positive firm performance (Taouab & Issor, 2019).

According to Taouab & Issor, (2019), most researchers have spread their attempts to ascertain different measures for the concept of the firm's performance. Still, there is an ongoing argument regarding the issues of the performance in these firms globally. This century's business environment has undergone adverse changes hence developing the element of uncertainty as well as complexity in the corporate world (Thomsen, 2018). The organizations should be able to learn how to adapt to the ever-increasing number of challenges that are arising on a daily basis in the economic world. Currently, the most important objective of every firm is the continuous performance. Taouab & Issor, (2019) asserts that the assessment and the measurement of the performance of the business is of the greater value because the firms are continuously looking for the effective and most efficient results.

The construction industry serves as an important factor to the development of any national economy. For the developing nations, construction industry is the most important sector as it opens up the interiors by developing new roads, airports as well as the railway (Kahvandi et al, 2017). Additionally, the construction industry also develops schools, hospitals, housing as well as other important buildings that will create employment for the surrounding population. Having a poor infrastructure in a country is the biggest problem because that will slower the development of the country by almost 90% (Kahvandi et al, 2017).

Running away from the financial constraints by completing the projects in time is always the main aim of the construction companies (UN & ONU, 2016). They will always strive to achieve their goals on time and without delay as that will enable them to have the upper hand in customer loyalty as well as trust. With timely finishing in projects, the construction companies will have the ability to expand their workforce and do more projects as opposed to the ones that lag behind in delivering their duties to the people (AbdulCalder, 2015).

Saudi Arabia in particular, during the last 10 years of the 19<sup>th</sup> century that is between 1990 to 2000, there was a total investment of around \$230 billion that was allocated to the construction industry (Azmat & Saad, 2018). Notably, the biggest investments are being undertaken by the Kingdom of Saudi Arabia government of which 42% services the nation's economy (Azmat & Saad, 2018). It is globally understood that the construction industry is the most vital and responsive sector in the economy. This is because it facilitates a huge size of the growth of an economy through its link with the other sectors of the economy. The construction sector as brought with it an appreciated amount of the sustainable economic development the global economy by bringing the element of satisfaction in the objectives and the generation of the outputs as well as creating employment and the equal distribution of income (Azmat & Saad, 2018).

Despite the diverse benefits of construction companies, many large companies have speedily adopted lean practices in their line of business with the potential of gaining competitive advantage by identifying the customers' needs and specification and to satisfy those needs. Construction companies are averse to some challenges like in terms of measuring and performance enhancement. This consists of issues of quality and safety, cost overruns, rejection of defective products, inadequate equipment and processes etc. (Sarhan et al, 2018). These challenges can actually contribute to significant waste and related environmental effects, Size, limited financial challenges, innovation adoption risk and cost intolerance and actual cost of initial investment outweighing the estimate (Jorgensen and Molokken-ostvold, 2006; Priyadarshinee et al., 2017).

Given the importance of construction companies to the economy of virtually all countries, and the benefits of lean practices can offer, it is pertinent to review previous research studies on the relationship between lean practices and firm's performance.

This will offer a more nuanced view of the concept of lean practices and firm performance, especially with regards to construction companies.

The rest of this paper is prepared as follows: a literature review on the relationship between lean practices and firm performance in Section 2 and Section 3 discusses the findings and conclusion.

## 2. LITERATURE REVIEW

The Lean Practices and Total Quality Management (TQM) concepts were developed due to the rise in the world competition (Alič, 2014). According to Gašparík, Gašparíková, & Ellingerová (2014), the global competition requires an outstanding degree of the quality achievement in the firms in order to satisfy customers. Additionally, a quality management practice will have a positive impact on the organization's performance and also have an influence on the returns in terms of profits; this is because TQM focuses on maintaining as well as improving the quality of the product as well as the performance of the business (Gašparík, Gašparíková, & Ellingerová, 2014).

In order to have a more understanding of the firm's performance it is of great essence to elaborate more on the fundamental concepts regarding the performance of the firm with regards its relationship with the lean practice total quality management. Various researchers have attempted to define the concepts of lean practices and firm performance. For example, Thomsen (2018) defines the organizations performance is a set of both the nonfinancial and the financial highlighters that give the statistics on of the level on which the objectives have been accomplished. Performance in a firm is something powerful thus needs to be judged and interpreted. It is advisable to comprehend the concept of performance and their characteristics in order to explain the concept of performance.

Lean practice is one of the most prominent ideas in operations and supply chain management in terms of uptake among practionner organizations (James et al, 2018). Lean implementation can typically be categorized as efforts which focus on waste reduction to lower costs, increased sales margins, improve resources efficiency and hence improve profitability of the firm (Lind, 2005). Waste reduction may include the improvement of inventory management policies, the closing of an un profitable store locations, optimizing the use of store space within stores to focus on more profitable products, better utilization of employee talent, improvements in transportation and logistics efficiency as well as preventing defective merchandise (Jeca et al, 2012).

The nature of the construction industry is complex. Construction projects need to be extremely managed to not only consider budgets and schedules, but also quality and environmental impacts (Formoso, 2002). The successful implementation of TQM in construction industry requires a commitment to quality from both management and workers. Also, the implementation of technological advances in design and construction, full knowledge of assembly process among workers have been identified as factors influencing total industry productivity for construction ( Gansen, 1984).

## 2.1 Lean practices and firm Performance

Lean practices from the theoretical perspective offer many benefits and opportunities for many enterprises more especially the construction companies. A study conducted by Alexander et al (2018) find out that both technical and human lean practices have a moderate to strong positive impact on the input and occurrence of incremental and radical process innovation in manufacturing organisations. The study was a quantitative survey and the sample size of the study constitutes about 340 respondents. The researchers recommended future research to include LM and process innovation in industries with intangible products such as services.

Usama et al (2018) conducted a study to identify the main causes of wastes in construction projects in Kingdom of Saudi Arabia. The findings confirmed that importance of using the lean techniques in minimizing wastes and increasing productivity projects. The study was a quantitative in nature and was able to include 109 firms.

Similarly, Abdallah, Alkhoraif and MCLAughlin (2018) conducted an exploratory study to examine the lean implementation within manufacturing SMEs in Saudi Arabia. The study employed both qualitative interview and focus group. Result revealed that change is brought about during implementing the lean. The study was able to interviewed 71 SMEs.

In the same vein, Jamil et al (2018) carried out a study to investigate the current state of lean construction implementation in the construction industry in the Kingdom of Saudi Arabia. The study was a quantitative survey and was able to get data from 282 respondents. The finding revealed that the level of implementation of lean construction in the KSA construction industry is increasing. The researchers recommend future research to investigate how lean construction tools or techniques can be applied in order to eliminate the different types of waste in the construction in KSA.

Mohamed et al (2015) conducted a study to evaluate the degree of readiness of Saudi construction firms operating in Hail region towards the implementation of QMS and the proper use of quality tools. The study was a quantitative consisting of 103 respondents. Findings revealed that high degree of misunderstanding of QMS strategies tools and techniques in the surveyed construction firms.

Fullerton & Kennedy (2014) conducted a study to examine the relationship between the lean manufacturing and firm performance. The study employed structural equation modelling to analyse the data. Finding revealed that the practice of lean manufacturing is positively and significantly related to firm performance.

In another related study by Zakaria, Dakhli & Marc (2017) to examine the lean application to the bidding phase in building construction in France. The result shows that execution of lean practices has a significant positive effect on the firm's performance and strategy. The study did not state the number of respondents included in the study.

Also, Mandeep, Mohammed, & Dannis (2019) investigated the potential challenges that hinder the effective transfer and sharing of tacit knowledge within a construction supply chain. The study was a quantitative and was able to gather data from 83 firms in United Kingdom (UK). The researchers concluded that not challenging the old process of doing work in construction firm impedes the effective transmission of tacit knowledge.

Furthermore, Sherif et al (2016) conducted a study to highlight the adoption of lean and agile integration within construction firms. The study was a systematic review and was not stated the number of journals used in. findings show that majority of the reviewed papers provides information related to the offsite concepts and its impediments and drivers. On the other hand limited attention was given to the lean and agile philosophies and simulation.

To Mohammed & Anas (2018) research was carried out to assess the level of awareness of lean practices in Moroccan construction industry as well as to identify the potential benefits and hindrances towards successful execution. The study was a quantitative approach and was able to gather data from 330 construction companies in Morocco. The result indicated that lean principles significantly affect safety, quality and environmental level.

Similarly, Sorokhaibam & Chandan (2017) conducted to identify and assess the barriers to execution of lean principles in constructions industry. The study was a review paper. From the review they discovered that most crucial barriers towards implementation of lean constructions are cultural diversities, whereas, non- existence of performance measurement and resistance to change by employees are the least important barriers.

Likewise, Fayiz & Mohammed (2019) conducted a research to assess the impact of lean practices on business performance. The study was a qualitative in nature and was able to get data from 228 respondents. They were able to concluded that execution of lean practices has significantly enhanced both operational and business performances.

Emmanuel et al (2017) conducted an exploratory study to examine the relationship between the last planner system and collaborative planning practices in UK construction industries. The research finds that present practice of collaborative planner moderately link with the last planner system in UK.

Moreover, Shuquan, Xiuyu, Xin (2017) conducted a study to explore implementation level of lean construction in Chinese firms. The study was a mixed approach. The researchers did not mention the number of firms involved in the study. Their findings showed that execution of lean practices in China and market factor, firm structure, culture and knowledge of lean construction are the main determinants of its implementation.

Also, Laila, Khodeir & Othman (2018) conducted a research to examine the interaction between lean and sustainability principles on the management process of design and construction projects. The study was a review one conducted in Egypt. The researchers recommended for AEC firms to assist in employing the lean principles on managing design and construction methods.

James et al (2018) carried out a study to examine the relationship between leanness and firm performance in the retail industry in U.S.A. the study used a quantitative approach. The finding indicates that lean theory positively impact in the retail industry in U.S.A.

### 3. FINDINGS AND DISCUSSION

This study has attempted to review past studies on the relationship between lean practices and firm performance with the view of determining the significant effect of lean practices on firm performance. The summary of the reviewed studies are given in the table below.

**Table 1**

S/N	AUTHORS & YEAR	OBJECTIVES	FINDINGS
1	Alexander et al. (2018)	To examine the effects of lean manufacturing practices on the process innovation	Both technical and human lean practices have a moderate to strong positive impact on the input.
2	Luana et al. (2019)	To examine criteria and lean practices and green performance assessment	Identifies the performance criteria and practices of lean and green and their relationship
3	Usman H., Issa, & Salama (2018)	To identify the main causes of waste in construction projects in KSA	Confirmed the importance of using the lean techniques in minimizing wastes and increasing productivity in KSA construction projects.
4	Andullah A., & Patrick M. (2018)	To examine the lean implementation within manufacturing SMEs in Saudi Arabia.	Provides empirical evidence how change is brought during implementing lean.
5	Jamil G. et al. (2018)	To investigate the current state of lean construction implementation in the construction industry in the KSA.	The level of implementation of lean construction in the KSA construction industry is increasing.
6	Mohamed A. et al. (2018)	To evaluate the degree of readiness of Saudi construction firms operating in Hail region towards the implementation of QMS and the proper use of quality tools.	The findings indicate that lean, green, six sigma framework decreased waste and improved quality and productivity.
7	Adul-Aziz B. & Melissa B. (2014)	Applying lean, Green, and Six-Sigma framework to improve exterior construction process in Saudi Arabia	The result indicates that lean, green, six sigma framework decreased waste and improved quality and productivity.
8	Fullerton, R. & Kennedy F.A (2014)	Lean manufacturing and firm performance	The findings revealed that Lean practices positively have significant relationship with firm performance.
9	Lianying Z., & XI C. (2016)	TO examine the role of lean tools in supporting knowledge creation and performance in lean construction	Result shows that leans instruments significantly influence knowledge creation which enhances lean performance.
10	Usama H. I. (2013)	TO minimise risk factors effect on time using lean construction principles.	As a result of decrease in percent expected time-overrun leading to decrease in total project time while percent planning complete values increased.
11	Zakaria D., Zoubeir L., & Marc B., (2017)	To examine the lean application to the bidding phase in building construction.	Execution of the lean practices has a significant positive effect on the firm's performance.

12	Sweis H., & Al-Hroub (2016)	To assessing the extent of implementation of lean techniques in Jordanian construction firms.	It was found some of the process adopted by Jordanians firms was in line with lean construction practices.
13	Madeep et al. (2019)	To investigate the potential challenges that hinder the effective transfer and sharing of tacit knowledge within a construction supply chain.	It was found that lean practices have the prospects to reinforce the delivery of social value of construction activities.
14	Sherif et al. (2016)	To highlight the adoption of lean and agile integration within construction.	Result shows that majority of the reviewed papers provide supported information that lean practices positively impact on firm performance.
15	Mohammed S., & Anas C. (2018)	To assess the level of awareness of lean practice in Moroccan construction industry.	The results show that lean principles significantly affect safety, quality and environmental level.
16	Fayiz D., & Mohammed I., (2019)	To assess the impact of lean practices on Business performance.	Execution of lean practices has significantly enhanced both operational and business performance.
17	Emmanuel et al. (2017)	To examine the relationship between the last planner system and collaborative planning practices in UK construction firms.	Findings revealed that the present practice of collaborative planner moderately link with the last planner system in UK.
18	Shuquan et al. (2017)	To explore implementation level of lean construction in Chinese firms	Findings revealed that lean practices positively impact on Chinese construction performance.
19	Laila M., & Khodeir R. O., (2018)	To examine the interaction between lean and sustainability principles on the management process of design and construction projects.	Result shows that implementation of lean principles failed. Meaning that the adoption of lean principles does not generate any change in operation and performance.

The reviewed literature presented in the table above indicates that studies on Lean Practices and Firm Performance has been going on for some years, the earliest one in this study being 2013. This seems interesting, although, there are earlier studies that this research did not cover. That's a limitation of the current study. Additionally, latest study on Lean Practices and Firm Performance paper in this study is 2019; it speaks volume of the on-going and recent researches in Lean Practices and Firm Performance.

Another issue is that majority of the studies employed Resource Based-View Model. This may probably be the claim by most authors that it is the most appropriate framework for firm competitive advantage. Some studies also combine theories to better understand the factors influencing lean practices. This could have a better explanatory power than using only one theory. This view is supported by Taherdoost (2018) that more than one theoretical approach is essential for a thorough understanding of the issues involved and for clarity.

Lastly, the most critical factors as viewed across the studies affecting lean practices and firm performance in most construction companies are lean tools/techniques top management support and size. Hence, construction companies should implement or adopt lean practices as its affect their performance positively.



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