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Issues and Impact of Lean Construction Implementation in The Malaysian Construction Industry

Mohd Arif Marhani[1*], Nurul Ain Syafiqah Muhammad Othman[2], Noor Akmal Adillah Ismail[3]

[1]Faculty of Architecture, Planning and Surveying,
Universiti Teknologi MARA, Shah Alam, 40450 MALAYSIA

*Corresponding author

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Abstract: The construction industry is one of the most important industries because of its end product, such as schools, hospitals, and roads. This industry contributes to social and economic development by providing buildings for other sectors' usage. Nevertheless, despite these contributions, the construction industry also has issues related to construction wastes, which need to be resolved. Hence, Lean Construction (LC) approach is a useful technique that traditionally converged on minimizing construction waste. LC is an approach based on lean production that emphasizes minimally invasive and maximally profitable production. This paper's primary purpose is to explore the usage of LC in the Malaysian construction industry (MCI). This paper aims to identify LC implementation issues, determine the impact of LC implementation, and recommend enhancing the LC implementation in the MCI.Data was obtained from G7 contractors registered with the Construction Industry Development Board of Malaysia (CIDB) by distributing questionnaire surveys, and the response rate was 20%. Through the descriptive analysis, it can be concluded that most of the respondents agreed with lack of knowledge was the major issue that occurred during the LC implementation in the MCI. Furthermore, the respondents agreed that LC positively impacted the LC practitioners' organization by encouraging them to undertake construction materials appropriately without wasting them and improving handling the site's resources. Based on the findings, it is recommended that the government should introduce this LC as a policy in managing a construction site, and LC practitioners should implement the best construction practices to obtain the best results. Additionally, it is also suggested that the industry educate the construction workforce on implementing this LC concept and create more ongoing seminars or training to upgrade their knowledge, skills, techniques, and processes. This research's outcomes play anessential role in reducing the gap between the theory and implementation practices of LC in the MCI. Thus, thisLC is hoped that future construction projects in the MCI can produce a better quality of end products towards a better quality of life.

Keywords: Lean construction, issue, impact, implementation, the Malaysian construction industry

1. Introduction

According to Daoud et al. (2020), the construction industry is one of the most critical sectors devoted to social and economic development and generates a country's wealth. The industry's outcomes deliver the users with socio- economic projects and infrastructure facilities such as schools, hospitals, and roads. Nowadays, Kupusamy et al. (2019) highlighted in their study that this industry is rapidly developing due to upgrading life, infrastructure projects, changes in consumption habits, and population growth. Unfortunately, the construction industry has numerous issues, especially on construction wastes, which need to be resolved (Ding et al. 2020). This is occurred in the Malaysian construction industry (MCI) to satisfy infrastructure projects' demands (Begum et al. 2010). In their study, de Souza et al. (2011) described that building is unique because it was one-of-a-kind projects, location development, and multi-agency temporary. Failure to set up a

*Corresponding author: arif2713@uitm.edu.my

good management system for the building infrastructure projects would lead to increase project costs and late completion of the low-quality project, ultimately reducing the contractors' gain (Nagapan et al., 2012). This problem calls urgently to adjust its processes, such as waste management and disposal. Thus, the industry adds an alternative approach to the construction industry to change its practices through lean construction (LC) implementation.

According to Shah and Ward (2007), LC was a concept derived from the construction sector's production industry to minimize waste to buildings' renovation. Yahya and Mohamad (2011) added that LC is an established method of managing and improving the construction process to transmit income using the things that define and funds, and deliver on time. Further, the LC approach is a useful technique that traditionally converged on minimizing construction waste (Mikulcic et al. 2020). Earlier on, Magalhaes et al. (2017) elaborated that LC practice must synchronize and manage the team members to sustain a continuous workflow to eliminate activities that do not add value. This research aims to explore the usage of LC implementation in the MCI. This research seeks to identify LC implementation issues, determine the impact of LC implementation, and recommend enhancing the LC implementation in the MCI. Through this research's recommendations, it is hoped that it can accelerate the usage of LC for future construction projects towards producing a better quality of end products in the MCI.

2. Introduction

2.1 The Malaysian Construction Industry

The MCI was considered to be very important to the country. The construction industry is vital in the development of the Malaysian economy and its growth. The MCI recorded a moderate increase of 4.2% in 2018 (Central Bank of Malaysia, 2019). Earlier on, the sector's growth slowing with records from 2000 to 2007, with an average gain of only 0.7% and gross domestic product (GDP) share dropping from 3.3% to 2.5% over the same period, which was reported to be the lowest percentage in the country (Construction Industry Development Board of Malaysia (CIDB), 2009). Furthermore, Nagapan et al. (2012) emphasized that construction waste is divided into physical and non-physical waste. Physical waste is formed from material loss during the construction stage, while non-physical waste may cause by poor management, such as time overruns and cost overruns (Ismam and Ismail, 2014).

The MCI was presently facing many issues, especially on the construction wastes, either related to physical or non-physical wastes. According to Wan Muhammad et al. (2013), the failure to complete projects on time was a global crisis in the construction industry, particularly in developing countries. This issue was evident from the underachieving the MCI with the latest public project delayed rate of 80 % (CIDB, 2009; Jorgensen, 2008). Besides, Abdullah et al. (2009) also recorded a 90% delay rate for projects controlled by Majlis Amanah Rakyat (MARA). MARA is one of the government agencies that play a significant role in the implementation of the construction policies of the MCI. Previously, Abdul Rahman et al. (2006) found that 45.9% of the completion dates were postponed during the construction phase. Furthermore, CIDB (2009) stated that the main factors for time overruns in construction projects were partial confidence, negative relationship, and communication crisis and coordination.

Also, Yahya and Mohamad (2011) added that the lack of building capacity during the construction phase, which fails to deliver the project due to a flow effect that causes delays and disruptions throughout the organization, was the most significant contributor to the state rule. These delays are known to cause losses to the client or developer and industry as the whole as construction has a significant impact on the economy (Ibrahim et al., 2010). There was, therefore, a need to enhance the alignment and efficiency of the construction process flow, which means project evaluation and management by reducing duplication and optimizing quality. Additionally, current construction practice in Malaysia has also resulted in duplication of jobs, extended authorization and working time, lack of transparency and increasing costs (Ibrahim, 2010).

Pratt (2000) pointed out that in the last decade, Malaysian projects, particularly magnificent monuments, have not been cost-effective and functional. He added that the budget had been exceeded in some cases, and the expected completion dates have not been reached. Moreover, the quality has not always been up to expectations. The weaknesses of the construction industry, among others, are the low image of the sector, the lack of formal and organized education and training of industry professionals, the lack of adequate appreciation of the role of construction technicians and technologists, the confrontational attitude of consultants and contractors, the lack of cooperation and sense of belonging (Adamu et al., 2012). It is time to rapidly reflect and respond before many more people are frustrated by theconstruction industry. In the face of the twenty-first century's challenges, the MCI should change its traditional construction method towards consistent efficiency, increased value-added operations, and enhanced product approach quality (Ahmad Bari et al., 2012; Ibrahim et al., 2010). The implementation of an LC approach to the construction industry seems to overcome the current issues. LC could excellently adapt to the MCI, but there is a need for upgradingthe skills and knowledge of industry players.

2.2 Lean Construction

Numerous LC definitions have been discovered from the literature reviews indicating the progressive evolution of lean methodology and its diversity. The descriptions stated below would best describe the method and application of LC (see Table 1). As the literature progressed, it can be concluded that the ultimate goal of LC is to minimize construction waste in the construction industry. This approach has evolved due to its ability to improve the constructionproject's performance using appropriate tools. It is a concurrent and continuous practices that need knowledge, patienceand cooperation from all the team members. It would help the LC practitioners to sustain in the market and make a profit.

Table 1 - Definitions adopted and modified from Ogunbiyi and Goulding (2013)

Authors	Definition
Radnor et al. (2006)	Lean is a philosophy that uses tools and techniques to create a change of organizational culture to implement the excellent practice of process/operations improvement that reduces waste, improvement of flow, more focus on customers' needs, & takes a process view.
Shah and Ward (2007)	A socio-technical integrated framework whose primary goal is to reduce waste by simultaneously eliminating or decreasing manufacturer, consumer & internal variability.
Ballard et al. (2007)	Lean is a fundamental business philosophy - one that is most effective when shared throughout the value stream.
Maudgalya et al. (2008)	Lean is a systematic approach to enhancing value to the customer by identifying & eliminating waste (of time, effort & materials) through continuous improvement, by 18 flowing the product at the customer's pull, to pursue perfection.
Lean Construction Institute (2013)	LC is a project delivery system focused on production management that emphasizes efficient & prompt value delivery.
Construction Industry Institute (2013)	LC extends from the objectives of a Lean production system-maximize value & minimizes waste-to specific techniques & applies them in a new project delivery process.
Marhani et al., 2018	LC is a continuous improvement approach that aimed to reduce construction waste by reducing the cost & duration of a project while promising enhancing the contractor's project performance towards its growth & profitability.
Babalola et al. (2019)	LC is an approach that manages the entire construction process of a project and the construction industry & in achieving a sustainable built environment.

LC is a big scale of adaptation from the Japanese manufacturing principles, and the concept is implemented to the construction processes. The idea also includes waste minimization and responsiveness to change within the value stream, continuous improvement, and quality from the early beginning. Cullen et al. (2005) stated that Toyota Motor Company had developed the principles of LC, which arose from adapting the concepts of lean production in Japan inthe late 1950s and early 1960s. Further, this approach could reduce the overall cost and cycle time while maintaining quality standards and improving project performance (Cho, 2011; Womack and Jones, 2003). According to Johansen and Walter (2007), construction industries worldwide have implemented a lean approach within the industry and have reaped its benefits. Marhani et al. (2018) elaborated in their study the existing frameworks or guidelines that the LC practitioners could implement. The examples apply LC methods to building new Australian LNG capacity, the Construction Industry Research and Information Association (CIRIA) 's guidelines and the Construction Lean Improvement Program (CLIP). There is a range of workshops and campaigns have been conducted to promote its acceptance to the industry. Additionally, seminars and conferences have been arranged to address critical issues related to the development and understanding of LC concepts with real-life case studies provided by some construction organizations (Construction Industry Environmental Forum (CIEF), 2009). Despite these efforts, there seem to be someobstacles to the successful implementation of LC.

Generally, lean adoption in the United Kingdom (UK) construction industry is relatively low (Mossman, 2009). Some studies have found obstacles to the implementation of LC. Such challenges must be resolved so that the building industry can reap the benefits of LC. The lean theory application to construction has been provided with improved quality, improved safety, reduced waste, increased productivity, increased customer satisfaction, increased reliability, and improved design (Ogunbiyi and Goulding, 2013). Earlier on, a study by Sarhan and Fox (2012) showed significant trends in the growth of a lean culture among UK construction organizations. lack of understanding of how lean design concepts can be successfully applied to different 15 building processes has also been exposed. A study of lean culture within UK construction organizations was carried out after a Jorgensen et al. (2008) survey. Since Egan's research, the lean theory has become an essential concept within the UK construction industry. Significant improvements have been made to the plan for change in the UK construction industry. Several studies have been carried out to assess the current level of awareness and application of lean design in the UK construction industry. The application of the Last Planner to the UK construction project is an example of such a study. Last Planner is one of the lean tools and techniques and perhaps the most sophisticated method. The methodology was applied to the UK construction project to assess its quality and its potential obstacles.

Meanwhile, according to Ansah et al. (2016), the LC approach is one of the most effective techniques for reducing

delays by adopting LC tools in the MCI. Nevertheless, Ahmed and Wong (2018) confirmed that CIDB, a governmental part of Malaysia's construction industry, does not have an LC approach for construction waste reduction in construction projects. It is a self-initiative of the construction organizations in implementing this approach. Motivation to change the organizational culture and training for this approach are successful steps to implement LC in a construction organization. Presently, Ahmed and Wong (2020) further explained that Malaysia is still early in adopting the LC approach despite the high growth in the construction industry.

Furthermore, according to Jorgensen (2006), a construction organization needs appropriate or suitable LC tools that undoubtedly equivalent to their requirements to embrace the project delivery. Suresh et al. (2011) added that there is no need to use all of the LC tools as most of the researchers highlighted using the exact tool at a precise time. The implementation of LC would give a better construction environment. Indirectly, it will positively impact the environment. Carneiro et al. (2012) confirmed that LC could improve a construction project's environmental performance. Additionally, Adamu and Howell (2012); Nahmens et al. (2012) the implementation of LC also showed the reduction of a construction project's time compared to the other traditional method. Interestingly, LC is the approach that aims to reduce the construction waste applied in the construction process (Singh and Kumar, 2020). Singh and Kumar (2020) further elaborated that LC was able to reduce construction projects' time. Also, the implementation of LC will improve the overall economy and give a faster turnover of the construction company itself. Meanwhile, as the construction projects are by their nature are complex; hence, successful integration with LC will improve the projects' project performances (Cho, 2011).

3. Research Methodology

In general, the research methodology carried out using a flow to accomplish the three-goal of the phases. First, it started with a review of literature related to the issue. It was performed to concentrate on the research area. The second is to investigate and identify the problem statement about the topic. And then, it continued by finding the aim and objectives of the studies. Literature studies have done for a better understanding of the issue. This is done using the internet, such as the construction website, reading and organizing the book, article, and related journal.

The next phase is the data collected through the distribution of the questionnaire survey. This phase is based on the previous extensive literature review. The research uses a 5-point Likert scale, ranging from strongly disagree to strongly agree (1 to 5). The questionnaire survey was divided into four main sections. Section A reviewed the respondents' demographic background, while Section B designated to identify LC implementation issues in the MCI. Besides, Section C proposed to determine the impact of LC implementation, and Section D is committed to recommending the enhancement of the LC implementation in the MCI. The questionnaire survey also was developed based on the sources from extensive literature reviews involving various authors.

In this questionnaire survey, the questionnaire was sent through stratified random sampling to 278 contractors in Malaysia based on the Table for determining sample size from a given population (Krejcie and Morgan, 1970). According to Saunders et al. (2012), this stratified random sampling is a probability sampling method involving samples of a population subdivided into smaller groups known as strata to cost reduction and improved response efficiency. This sampling method is a more precise metric since it is a better representation of the overall population. The unit of analysis used for this research is the construction organizations. The contractors registered with the CIDB underclass G7 categories were identified based on the industrialized building systems (IBS) contractor population from the CIDB directory. The response rate was 20%. This response rate was finally achieved after several efforts were conducted regarding personal contacts and follow-up emails and calls. Thus, this research is confident with the respondents' percentage of response rate taken from a high-quality group.

The data collected from the survey of this research were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) statistics software version 24. A descriptive statistic is adopted to portray the data's kind and quality on respondents and variables (Sekaran and Bougie, 2009). Descriptive statistics such as mean (μ) and standard deviation (σX) illustrate the basic features of the data obtained in this research. It can be bestowed in the form of tables,charts or graphs. Hence, descriptive analysis is carried to present the data in an easy to grasp and interpret. The researchdealt mainly with the variables' ranking based on their mean value.

4. Findings and Discussions

This paper has been done to promote LC among the G7 contactors in the MCI. This paper has three objectives: to identify the issues of LC implementation, determine the impact of LC implementation, and recommend enhancing the LC implementation in the Malaysia construction industry. There were five areas in each of these objectives: managerial, financial, education, technical, and human.

4.1 Demographic Information

From demographic information (see Fig. 1), after analyzing SPSS, it was found that the majority of respondents who answered this paper questionnaire consist of the Site Quantity Surveyor working with the contractor, which is 42%. This was because the site quantity surveyor played a vital role in the construction industry from the beginning of the project until it fully completed. And LC has closely related to the site QS that site QS determines whether a building can save cost or not control construction material costs. For analysis of working experiences, it was found that most

respondents and the highest percentage answering this question consisted of respondents working less than five years which is 74%. Even though they have less than five years of working experience, they quickly understand and learn and work more time as the economy boomed and grew.

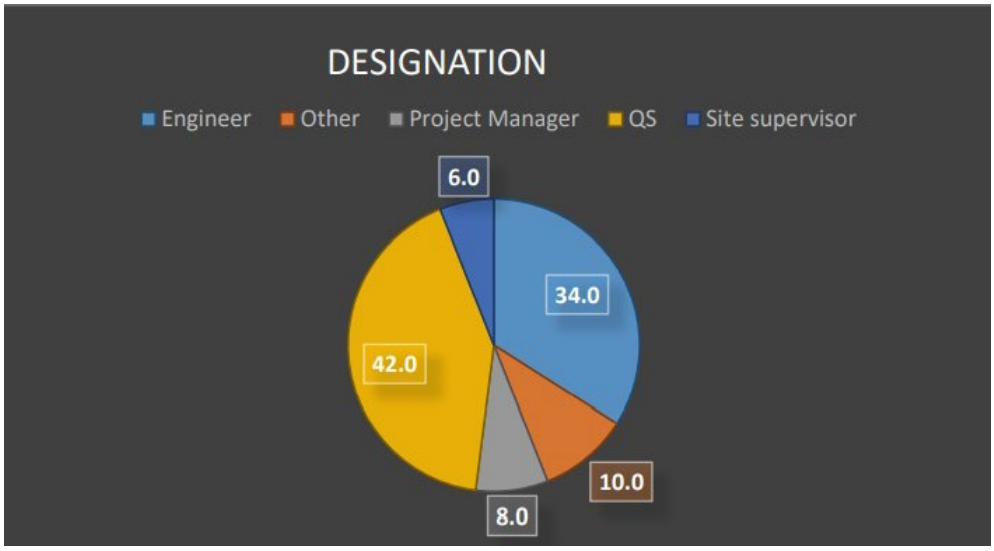

Fig. 1 - Designation

4.2 Issues of LC Implementation in The Malaysian Construction Industry

The first objective of this paper is the issue of LC implementation. There are five parts to issue, namely management issue, financial issue, an education issue, technical issue and human issue. It is divided into three different topics for a management issue, each analyzed individually and then referred to each other. The mean of the other problems was 3.37 (see Table 2). It has received a great deal of support from the contractors; this is because of Malaysia's downsizing, which lacks supply chain and low integration due to improper management. For the financial issue, there are also three issuers distributed under this economic condition. It was then analyzed and compared to see the highest problem supported by the contractor. Therefore, the highest financial issue was low skill salaries with the highest mean of 3.58. This is because most local companies pay wages that are not comparable to the job's workers, which causes some of them to quit. Whereas for issue under education, it can be seen from the comparison table thatthe highest point is the issue of lack of holistic implementation, with a mean value of 3.62. The contractor strongly supports this issue due to the lack of knowledge in some communities, especially those working in the construction sector, on the importance of holistic implementation. The technical issue was an issue with a high mean value and goodsupport from the contractor, i.e., incorrect and incomplete design with a mean value of 3.23. Most of these issues occur due to a lack of agreement within a team while doing the work. For the last part of this issue, this human atheism is three issues in it and analyzed. After being analyzed and identified, one point stands out among the others, namely the case of misconceptions about the lean practice. This is because the human attitude lacks knowledge and asks if it does not know why it exists.

Thus, there are still many issues that cannot be adequately handled. Therefore, those who are new to the construction sector need to consider and address it effectively and effectively so that further development and less waste can be created later.

Table 2 - Issues of LC implementation in the Malaysian construction industry

Item	Description	Mean score (μ)	Std. deviation (σX)	Ranking
	Managerial			
1.	Lack of top management support and commitment	3.27	1.031	2
2.	Unsuitable organizational structure	3.27	1.050	3
3.	Lack of supply chain and integration	3.37	1.058	1
	Financial			
1.	Low skill Salaries	3.58	1.073	1
2.	Insufficient project financing	3.48	1.075	2
3.	Risk aversion	3.35	.883	3
	Educational			
1.	Lack of technical skill, high-level illiteracy	3.44	1.145	2
2.	Lack of Holistic implementation	3.62	.993	1

3.	Lack project team skills	3.40	1.125	3
	Technical			
1.	Lack of buildable designs	2.98	1.093	3
2.	Poor performance assessment methods	3.27	1.012	1
3.	Incorrect and incomplete designs	3.23	1.131	2
	Human			
1.	Poor understanding of client's brief	3.46	1.038	3
2.	Misconceptions about lean practice	3.71	.977	1
3.	Fear of Unfamiliar practices	3.67	1.080	2

4.3 Impact of LC Implementation in The Malaysian Construction Industry

The second objective of this paper was to determine the impact of LC implementation in MCI. For the first impact, under management, three parts are analyzed and then compared. One of the highest has implications under management support from the contractor, which can be useful feedback and measures the system for review and correction with a mean value of 4.02 (see Table 3). This LC implementation can be referenced again to determine what went wrong with each project being run by a company, which will prevent them from losing. For the impact of financial underwriting, there are two highest impacts supported by the contractors or respondents who answer this question. The effect increases the growth in profit margin and increases sales growth lowering the cost of production. Both have the same mean and std deviation of 3.90 and 8.69, respectively. From this impact, it can be seen that the implementation of this LC can avoid wasting mainly on the cost of construction. That cost can be used for other purposes, and automatically it can benefit more. Besides, there is also an impact on education. The effects are divided into three parts, and it analyzed and then compared those effects. For impact under education, it is found that there is a very high impact supported by the contractor and has a high mean value. The result is like enabling the stakeholders to identify the problems, with a mean value of 3.62. This education is essential because, through education, contractors can learn many useful pieces of knowledge, especially in this construction industry. For impact under technical, it is found that there is one of the highest impact value means, the effect is that design helps to optimize the use of several resources, especially for engineers and architects. This LC allows them to design appropriately and quality without wasting. The last impact is under human influence. Also divided into three effects and analyzed and compared. There is an impact that is strongly supported by the contractor and has a high mean value. The result is empowering workers to reduce waste and pollutionby taking appropriate action, with a mean reading of 4.13. Usually, focus on the top; if their management is right, then implementing a project is exemplary.

Thus, there is a lot of impact on the implementation of this LC, the MCI. Even if the implementation of this technique is comprehensive, the effect will be huge too. Perhaps the construction industry in this country is comparable to the international one.

Table 3 - Impact of LC implementation in the Malaysian construction industry

Item	Description	Mean score (μ)	Std. deviation (σX)	Ranking
	Managerial			
1.	Helping contractors increase productivity while protecting workers from injuries and hazards to occupational health	3.98	.874	3
2.	Can be useful feedback and measures the system for review and correction	4.02	.918	1
3.	Enabling stakeholders to identify problems and provide continuous improvement efforts as each constraint increases time and cost.	3.98	.860	2
	Financial			
1.	Increase the market share and growth rate	3.75	.789	3
2.	Increase the growth in profit margin	3.90	.869	1
3.	Increase the growth in sales, lower the cost of production or production cost per unit	3.90	.869	1
	Educational			
1.	Helped to incorporate knowledge and information relevant with lean construction	3.44	1.145	2
2.	Enables the stakeholders to identify the problems	3.62	.993	1
3.	Provide continuous improvement effort	3.40	1.125	3
	Technical			

1.	Design helps to optimize the use of a number of resources	4.08	.710	1
2.	Product design leads to less energy consumption by ensuring that product design is compatible with current manufacturing processes and procedures.	3.85	.777	3
3.	Have a positive impact and a positive relationship between product design and company economic results	3.96	.766	2
	Human			
1.	Empowering workers to reduce waste and pollution by taking appropriate action	4.13	.715	1
2.	Enhance creativity among employees effectively using materials	4.08	.710	2
3.	Potential for increasing maintainability, as well as sustainability	3.94	.669	3

4.4 Recommendations on The Ways to Improve LC in the Malaysian Construction Industry

The third objective is the recommendation for improving LC in MCI. For guidance under management, there are three recommendations below. For a proposal under management, one good suggestion was found and supported by a higher mean value contractor than the other. The recommendation is the environment, building facilities of long-term value and protecting and or restoring the natural environment, with a mean value of 4.25 (see Table 4). This is because the environment is essential not only to humans but also to other lives. In recent times, environments are polluted as a result of these construction industries. Simultaneously, the recommendation under financial is also divided into three offers and analyzed and compared. It was found that there was a high recommendation of the mean value. It suggests increasing output flexibility with a mean value of 4.12. This is because increasing the output flexibility has a positive impact on a company's income. Next is the recommendation under education. After analyzing and comparing, the proposal on improving strategies for various business outcomes was the highest supported by the converter, with a mean value of 4.19. This is because the right approach results in significant and organized work. For the recommendation under technical, it is found that the most recommended contractor support is about encouraging communication between project team members, with a mean value of 4.25. With good communication, they can share their ideas and ideas for working on a great project. The last recommendation is under recommendation. There is one recommendation under humans with a higher mean value than the other, establishing problem-solving groups, with a mean value of 4.13. This shows that the team members and being knowledgeable, talking about the project, and team members are also the place to solve problems and ask each other questions. They must have an open attitude in accepting all the advice they give.

Therefore, this recommendation is intended further to enhance the effectiveness of this LC in Malaysia. This is because the implementation of this LC gives the benefit of being correctly implemented. Not only waste can be avoided but also the benefits that can be gained. Even the environment is not contaminated.

Table 4 - Recommendations the ways to improve LC in the Malaysian construction industry

Item	Description	Mean score (μ)	Std. deviation (σX)	Ranking
	Managerial			
1.	Minimization of waste in the use of production resources, whether human or material	4.02	.700	3
2.	Combining lean techniques with recycling to reduce waste, both material and financial	4.17	.617	2
3.	Environment, building facilities of long-term value and protecting and/or restoring the natural environment	4.25	.682	1
	Financial			
1.	Increase output value through systematic consideration of customer requirements	4.10	.748	2
2.	Ensuring high quality of the end product, boosting confidence level and safety of the construction workers; and maintaining the sustainability of the project itself	4.04	.713	3
3.	Increase output flexibility	4.12	.704	1
	Educational			
1.	Improving the management system,	4.17	.785	3

2.	Improving diversifying techniques for detecting waste,	4.17	.648	2
3.	Improving strategies for various business outcomes	4.19	.742	1
	Technical			
1.	Eliminating contractual barriers that prevent communication and innovation among designers and contractors	3.88	.900	3
2.	Integrates an organization across disciplines,	4.10	.774	2
3.	Encouraging communication between project team members	4.25	.711	1
	Human			
1.	Creating your own workforce	4.04	.791	3
2.	Establishing problem solving groups	4.23	.703	1
3.	Holding formal training programs	4.13	.658	2

5. Conclusions and Recommendations

The main objectives have been identified, and respondents were the contractors who are implementing the LC approach. Therefore, the method of this paper was developed subsequently. The findings can be obtained veryrelevantly based on information analysis, and the conclusions are drawn. This research aims to explore the usage of LC in the MCI. The results of this paper met all of the aim and objective, which are stated earlier. The success of the goals is vital to assure that the objective is achieved in this research. Based on the results of the data analysis in this research, it is found that the paper objectives set have been completed successfully. The results showed that all G7 contacts in this research agreed with the stated objectives. This proves that implementing LC is very important in the construction industry now.

There is some recommendation to overcome the issues of LC, such as contractor should hold workshops to enhance knowledge and skills of the employees on LC. The contractors also should provide seminars to their employees to improve their knowledge and work practices. They would have been more aware of the importance of LCand added the right skills and techniques when implementing this LC. This is important for the future towards more advanced technologies. Furthermore, a worker should explore more about LC practices in the daily construction process. Learning self-study is better than expecting others to teach it first. Lastly, it is suggesting to introduce practicaltips or rewards when applying this LC. It can be trained before, during, or after completing a project. It is relatively new in the construction world; there is a demand for tips or rewards and strategies to control it and make the right judgments.

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