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Barriers to lean construction: a systematic literature review

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Abstract Lean Construction (LC) is a philosophy aimed at enhancing process efficiency and reducing waste in the construction industry. LC emerged from applying and adapting Lean Manufacturing concepts to construction. The term LC gained prominence in 1992 following the publication of "Technical Report No. 72 – Application of the New Production Philosophy to Construction," by Lauri Koskela. Given that these concepts originated in manufacturing, certain characteristics of the construction industry can prevent their application, acting as barriers that hinder Lean Construction's implementation. Recognizing and identifying the difficulties associated with LC practice can serve as input for organizations to prepare themselves, thereby increasing the chances of successful LC implementation. In this context, the goal of this research was to identify barriers to LC mentioned in scientific articles since 2010. The methodology employed was the systematic literature review (SLR) technique, along with bibliometric data analysis. The SLR was conducted using the Scopus and Emerald databases. Sixty articles were selected in the SLR from which forty barriers to LC were extracted, in different countries and contexts, such as: difficulty in obtaining support and commitment from senior management, resistance to change by leadership, lack of good communication, unskilled labor, lack of knowledge about lean construction philosophy, among others.

Keywords: Lean Construction; Barriers; Challenges.

1. Introduction

The civil construction industry faces production issues characterized by high levels of waste, low-quality products, a high occurrence of construction pathologies, and inefficient and ineffective processes (Souto Filho et al., 2022). This scenario drives construction companies to seek tools that enable better utilization of their resources (Pereira et al., 2015).

Thus, the construction industry has been making adaptations to overcome traditional management methods (Ribeiro et al., 2020). Lean Construction is a tool used with the purpose of reducing waste, costs, and deadlines, thereby increasing efficiency and productivity on construction sites (Pereira et al., 2015)). The philosophy of lean construction originated from adapting the lean concept to civil construction, following the publication of "Technical Report No. 72 - Application of the New Production Philosophy to Construction," by Koskela (1992).

According to Shurrab e Hussain (2018), similar to the manufacturing industry, the civil construction industry is concerned with product quality, reducing non-value-adding time, and with technological advancement. Therefore, the lean mindset applied to civil construction, known as lean construction, has the potential to generate positive impacts for companies in the sector (Ribeiro et al., 2020). This management philosophy is recurrent in construction organizations with the aim of reducing costs, achieving productivity gains, and meeting customer needs (Souto Filho et al., 2022).

However, since these concepts originated in manufacturing, it is common for certain characteristics of the civil construction to complicate their application, acting as barriers in the implementation of Lean Construction. Therefore, this study aims to identify the barriers to Lean Construction mentioned in the literature since 2010. Recognizing and identifying such barriers can have a significant impact on the construction industry, as strategies to improve the implementation of lean construction are associated with or derived from the significant barriers determined through studies and research (Moyo; Chigara, 2021).

2. Theoretical Framework

Lean production, or the Toyota Production System (TPS), was developed by Toyota under the leadership of engineer Taiichi Ohno. This management system focused on eliminating waste and reducing residues (Womack et al., 1990). The Lean Manufacturing philosophy is an organized production system designed to be lean, that is, structured to remove any slack. However, it provides qualifications to exercise control over the work environment and various means of approach and problem resolution (Womack et al., 1990).

According to Womack e Jones (1998), "muda" is a Japanese word that means waste, that is, something that consumes resources but does not create value. In this context, engineer Taiichi Ohno identified seven types of waste: defects, overproduction, inventory excess, unnecessary transportation, unnecessary movements, unnecessary processes, and waiting time. It is in this context that the term "Lean" emerges, which is the way of doing more with less, whether it be human effort, equipment, resources, time, or space. The goal of the lean mindset is always to minimize losses and eliminate waste. The five principles of Lean are:

- Specify Value - Involves identifying the value defined by the customer and establishing value in terms of specific products that meet customer needs, at specific prices and times.

- Identify the Value Stream - The value stream is the set of all actions required to bring a specific product through the three critical managerial tasks: problem-solving task, information management task, and physical transformation task.
- Flow - After the value stream is mapped and all steps that generate waste are eliminated, it is necessary to ensure that the remaining steps flow, establishing a continuous flow until the process is complete.
- Pull - Involves designing, scheduling, and manufacturing exactly what the customer wants, doing what customers say they need, thus the customer is pulling the product when it is needed.
- Perfection – Continuous improvement of the company's activities in the pursuit of excellence.

Lean production can be understood as a new way of designing and making things, differing from mass production and craft methods in terms of the objectives and techniques applied on the factory floor, in design, and throughout supply chains. It aims at optimizing the performance of the production system relative to a standard of perfection to meet unique customer requirements (Howell, 1999). There are two types of phenomena in all production systems: conversions and flows. Flow activities incur costs and consume time, so improving these activities consists of reducing or eliminating them, while conversion activities add value, and it is only necessary to make them more efficient (Koskela, 1992).

According to Koskela (1992), the construction industry could adopt Lean principles, as in manufacturing, this philosophy enhances competitiveness by identifying and eliminating waste, that is, activities that do not add value. While construction is traditionally viewed and modeled as a set of value-adding conversion activities. To apply manufacturing concepts to the construction industry, it is necessary to recognize the suppliers, products, and processes. However, a major challenge is that in this sector, clients also participate in the product formation (the provision of service) and thus, directly contribute to the final quality (Neto Piccirillo et al., 2016).

According to Howell (1999), managing construction under Lean principles differs from typical contemporary practices because it encompasses a clear set of objectives for the delivery process, aims to maximize performance for the client at the project level, designs products and processes simultaneously, and applies production control throughout the project's life. To achieve this, the five Lean principles (value, value stream, continuous flow, pull, and perfection) are used, along with eleven criteria for the design and improvement of processes that need to be associated with the application of Lean in construction (Koskela, 1992):

1. Reduce Non-Value-Adding Activities: Cut down on waiting activities, which consume time, resources, or space without adding value.
2. Increase Production Value by Considering Customer Needs: Identifying the customer, their needs, and feedback boosts productivity and enhances product value.
3. Reduce Variability: Customers prefer uniform products. Moreover, variability increases the volume of non-value-adding activities.
4. Reduce Cycle Time: Aim to reduce the time spent on inspection, movement, or waiting.
5. Simplify by Reducing Steps and Parts: Cut down on activities and steps that have low or no value.
6. Increase Output Flexibility: Streamline steps and minimize complications and changes.
7. Enhance Process Transparency: Processes need to be clear through information transparency. Lack of process transparency increases error propensity, reduces problem visibility, and diminishes motivation for improvement.
8. Focus Control on the Complete Process: Processes should be measured; hence, it is necessary to develop evaluations and performance indicators.
9. Build Continuous Improvement into the Process: Reduce waste, enhance the value of activities, and establish efforts and rewards for improvements.
10. Balance Flow Improvement with Conversion Improvement: The more complex the process, the greater the impact on improving flow and conversion.
11. Benchmarking: Assess the company's position while looking for improvement opportunities.

Lean Construction results from applying a new production management approach to construction. The key features of Lean Construction include a clear set of objectives for the delivery process, aiming to maximize client performance at the project level, simultaneous product and process design, and the application of production control throughout the product's lifecycle, from design to delivery (Howell, 1999). Lean Construction (LC) is a critical system for improving outcomes for organizations in the construction industry. However, there are barriers that hinder the successful implementation of LC. The literature identifies many barriers, making it challenging to diagnose the presence of these barriers within an organization (Mano et al., 2023).

Koskela (1992), in his technical report No. 72 - Application of the New Production Philosophy to Construction, published by the CIFE (Center for Integrated Facility Engineering), identified barriers to the diffusion and implementation of Lean Construction. These include the manner in which concepts are presented for teaching and spreading the approach, which are often specific to certain types of manufacturing and difficult to internalize and generalize from a construction perspective; the lack of international construction competitions; and the delayed response from academic institutions. However, he also considered these barriers to be temporary, as all organizations in the construction can apply Lean Construction to reduce defects, time, and accident rates.

Although there is a lack of agreement on a specific definition or conceptualization for Lean Construction, most studies and definitions agree that LC is a philosophy of improvement, both in terms of collaboration among all project stakeholders and in maximizing value for all of them and for the client. It also aims to eliminate waste, achieve continuous improvement, enhance material flow, reduce costs, and increase safety and quality (Balkhy et al., 2021).

Thus, Lean Construction is a strategy to improve the efficiency of civil construction processes. However, there are characteristics within an organization that act as barriers, as some of these barriers not only make implementation difficult but can also be responsible for its failure (Mano et al., 2023).

3. Materials and Methods (or Methodological Procedures)

This research employed bibliographic research, which can be described as an investigation process to solve, answer, or delve deeper into a query regarding the study of a phenomenon. To conduct bibliographic research, various resources can be used, such as: books, scientific articles, theses, dissertations, yearbooks, journals, laws, and other types of written sources that have already been published (Sousa et al., 2021).

Conducting bibliographic research can be challenging due to the availability of bibliographic databases and the abundance of scientific articles, which creates a significant dilemma in selecting articles for the theoretical argumentation fundamental to research and academic texts (Treinta et al., 2014). Therefore, it is up to the researcher to establish a bibliographic research strategy that facilitates the identification of the main works, as well as ensuring the ability to establish the boundaries of knowledge stemming from scientific discoveries (Treinta et al., 2014).

A systematic literature review is a scientific method for the search and analysis of articles in a specific scientific field (Conforto et al., 2011). It is a type of research that uses existing literature on a particular topic as its data source. In other words, systematic reviews are designed to be methodical, explicit, and reproducible (Sampaio; Mancini, 2007).

Thus, conducting a systematic literature review goes beyond the common practice of performing a literature review as part of an academic research project. A systematic review is a form of research that follows specific protocols and aims to bring some logical order to a large body of documents (Galvão; Ricarte, 2019). This type of study allows for the tracking of project developments, suggests new directions for future investigations, and identifies which research methods have been used in a specific area (Sampaio; Mancini, 2007).

Therefore, by adopting a systematic approach in a literature review, one achieves higher levels of reliability. This means defining a strategy and a systematic method for conducting searches and analyzing results, which allow for repetition through continuous cycles until the objectives of the review are met (Conforto et al., 2011).

Bibliometric Analysis

Bibliometric analysis is a method that encompasses the application of quantitative techniques to scientific research and bibliographic studies (Moresi et al., 2021). The data derived from bibliometric studies determine the contribution of scientific knowledge resulting from publications in specific areas (Soares et al., 2016). Bibliometrics can also be defined as the set of research methods used to outline the structure of knowledge in a scientific field through the quantitative and statistical approach of various bibliographic data (Vanti, 2002).

One of the methods used in bibliometric studies is the counting of bibliometric units, followed by ranking them in order of occurrence, and drawing conclusions based on their frequencies (Moresi et al., 2021). Bibliometrics enables the examination of the state of science and technology through the scientific production recorded in a data repository. This method also allows for positioning a country in relation to the world, an institution in relation to a country, and individual scientists in relation to their scientific communities. Bibliometric analysis often relies on computing scientific articles, patents, and citations (Soares et al., 2016).

However, bibliometrics is not limited to the creation of citation indices alone. It is also considered multidisciplinary and applicable to a wide variety of different fields. Being the conceptual foundation for several other metrics, it reveals a strong interdisciplinary relationship, while at the same time, it has its own peculiarities and applications (Moresi et al., 2021).

In this manner, bibliometric analysis seeks to identify what knowledge has been produced by the scientific community on this topic, assessing the main research trends concerning it. It starts from the principle that, when initiating new academic research, all knowledge generated in this line of research should be mapped for the construction of knowledge related to it (Treinta et al., 2014).

Content Analysis

Content analysis encompasses a set of techniques for analyzing communications, using systematic and objective procedures to describe the content of messages through both quantitative and qualitative indicators. Its aim is to infer knowledge about the conditions of production or reception of these communications (Bardin, 1977).

Bardin's (1977) strategy for content analysis can be summarized into five stages: 1 - Pre-analysis, which serves as the stage for setting objectives; 2 - The exploration of material, during which the materials (articles, books) are selected; 3 - Exploratory reading, categorization, or coding, where theories are identified, and content segments to be used are classified. 4 - Treatment of results, analyzing the data coded in the previous step; 5 - Interpretation of the obtained results, aiming to address research questions.

Research Strategy

Based on the literature reviewed regarding systematic literature review, content analysis, and bibliometric analysis, this study followed the steps outlined below.

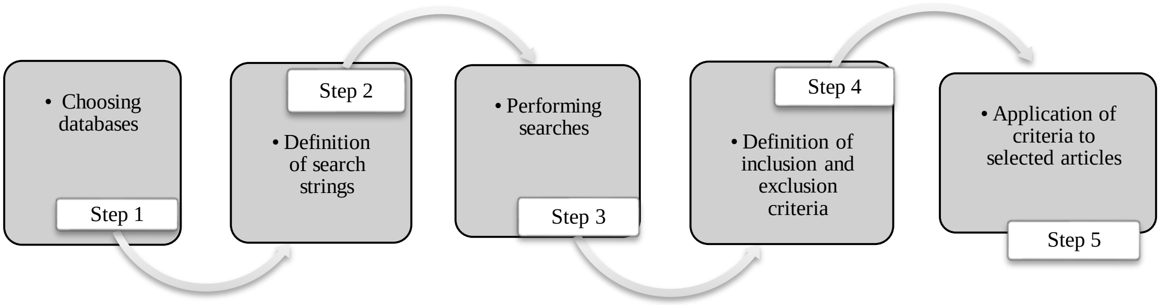


Figure 1- Research Strategy
Source: Prepared by the Author

To determine the databases to be used, several precautions were taken into account, such as reliability, diversity, and content availability. Therefore, the chosen databases were Emerald and Scopus. For the definition of the search strings, two keywords were selected (barriers, challenges). After conducting the first two steps, searches were carried out in the databases, limiting the scope to articles published between 2010 and 2023. Thus, the terms Lean Construction (Title), Barriers (Title and abstract), and Challenges (Title and abstract) were used; however, the keywords were not used simultaneously.

This study was conducted from May 31 to June 2, 2023, resulting in a total of 208 articles. Subsequently, criteria for article exclusion and inclusion were established. A total of 96 duplicate articles and 34 articles that were either unavailable or inaccessible were excluded, leaving 78 articles for the initial analysis. Titles, abstracts, and introductions were then reviewed to determine which articles addressed the following research question: What are the barriers to Lean Construction? This process led to the exclusion of 18 articles that did not meet this criterion. Finally, a comprehensive reading of the 60 selected and included articles was performed to extract information.

Through this reading, the main barriers to Lean Construction mentioned in the literature were identified and listed, in order to examine the similarities and differences in the cited barriers and the context in which they are embedded.

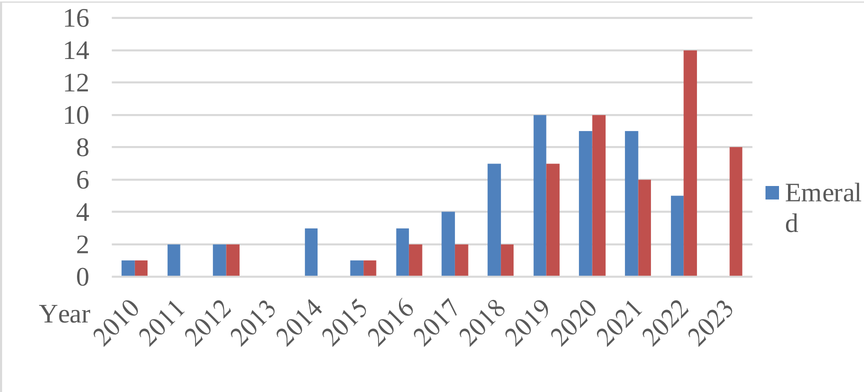
The parameters used for conducting the bibliometric analysis were the number of publications per year and the country of origin of the first author.

Content analysis was applied through open coding, aiming at identifying the barriers mentioned by each of the authors. From this analysis emerged the first set of barriers; subsequently, the nature of each barrier was verified, based on the study developed by Mano et al. (2020), in their article 'Criticality assessment of the barriers to Lean Construction,' published in the International Journal of Productivity and Performance Management.

4. Results and Discussion

In this section, the findings from the bibliometric analysis and content analysis based on the selected articles are presented. The initial outcome relates to the number of publications per year (Chart 1).

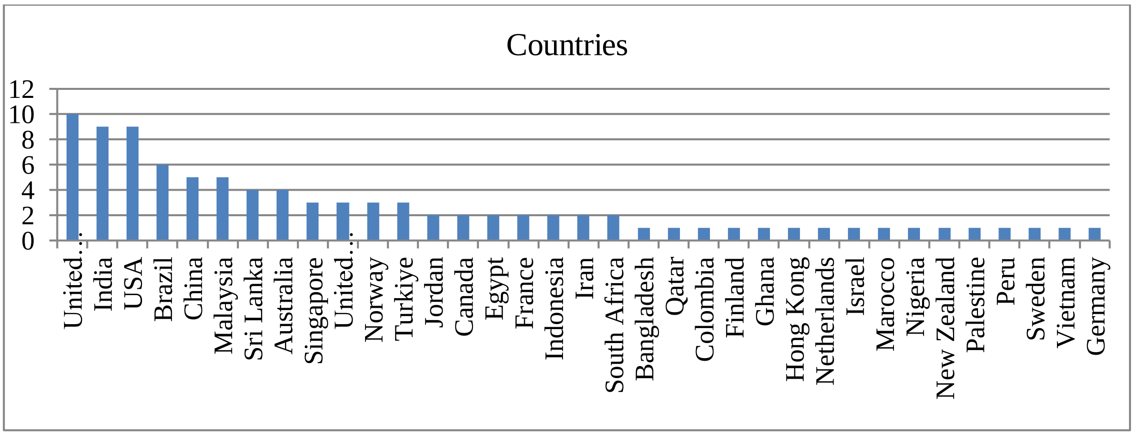
Chart 1 - Number of Publications per Year



Source: Research Data

The scenario depicted in Chart 1 indicates a steady increase in the number of publications from 2016 onwards, in both databases, with the numbers remaining stable before this time. Additionally, a decrease in publications within the Emerald database for 2023 is noted, with no publications recorded up to the date of this research. The results regarding the countries of origin of the lead author(s) are shown in Chart 2.

Chart 2 - Countries of Origin of the Lead Author(s)



Source: Research Data

In Chart 2, it is evident that the countries with the most prominence were the United Kingdom with 10 lead authors, the United States (9), India (9), Brazil (6), Malaysia (5), and Sri Lanka (4), whereas in the other identified countries, the number of lead authors is less than 4.

The benefits associated with the implementation of this philosophy have significantly stimulated studies and inquiries regarding lean Construction and the challenges faced during its execution.

The literature identifies numerous barriers to implementing Lean Construction. Nevertheless, it is crucial to take the context of these studies into account. Moyo and Chigara (2021) emphasize Lean Construction's significance, noting that research conducted in various countries, including Brazil, India, China, Morocco, the United States, Bangladesh, and others, supports this perspective. Consequently, the barriers identified are listed in Table 1.

Table 1- Barriers to Lean Construction

Code	Barriers	References
B1	Lack of knowledge or awareness about lean construction philosophy	1; 2; 3; 4; 5; 7; 8; 9; 10; 11; 12; 14; 15; 17; 18; 19; 20; 21; 22; 23; 24; 26; 27; 29; 33; 35; 41; 44; 46; 47; 48; 49; 53; 54; 56; 57; 59.
B2	Lack of a long-term philosophy and planning	2; 3; 4; 5; 14; 26.
B3	High labor turnover	3; 5; 7; 9; 14.
B4	Inadequate pre-planning	3; 10; 11; 24.
B5	Resistance to change	1; 5; 7; 9; 10; 11; 12; 13; 14; 17; 19; 20; 22; 23; 27; 28; 34; 40; 41; 42; 45; 46; 47; 49; 51; 54; 55; 58; 60; 61.
B6	Lack of quality planning	3; 4; 5; 9; 11; 14; 42; 54; 56.
B7	Lack of focus and understanding of customer needs	1; 3; 4; 5; 8; 10; 11; 12; 14; 18; 20; 24; 25; 60; 61.
B8	Financial constraints	1; 8; 9; 10; 11; 12; 13; 14; 15; 16; 19; 20; 23; 28; 30; 40; 45; 46; 51; 54.
B9	Project subcontracting	1; 6; 7; 9; 10; 11; 12; 43; 44.
B10	Lack of green initiatives	9; 11; 21; 55.
B11	Lack of evaluation of project performance or progress	1; 3; 4; 5; 6; 7; 8; 10; 11; 12; 14; 18; 24; 25; 38; 39; 60; 61.
B12	Lack of appropriate lean technology or tools	2; 3; 4; 8; 9; 10; 12; 13; 14; 16; 17; 18; 19; 20; 23; 29; 34; 35; 38; 40; 46; 56; 59.
B13	Lack of government support	1; 3; 5; 6; 7; 8; 10; 11; 12; 14; 15; 16; 18; 20; 22; 25; 28; 29; 45; 47; 51.
B14	Lack of standardization	6; 8; 10; 12; 13; 18; 19; 27; 29; 31; 33; 51; 57.
B15	Weak leadership and insufficient management skills	1; 3; 4; 5; 6; 7; 8; 9; 10; 12; 13; 14; 15; 17; 18; 19; 20; 21; 22; 23; 27; 35; 43; 44; 45; 46; 49; 50; 52; 54; 56; 58.
B16	Lack of incentives and motivation and low professional salaries	3; 5; 7; 10; 12; 14; 16; 19; 27; 39; 46; 52; 57.
B17	Time and commercial pressure	1; 3; 5; 6; 7; 8; 10; 12; 29; 32.

Code	Barriers	References
B18	Lack of good communication	2; 3; 4; 5; 8; 10; 12; 14; 17; 18; 21; 29; 31; 36; 40; 42; 50; 57; 58.
B19	Lack of clarity in objectives and values	2; 3; 4; 5; 6; 8; 9; 10; 12; 13; 14; 17; 18; 24; 49.
B20	Lean culture needs to be introduced and implemented in the organization	1; 2; 4; 7; 8; 9; 11; 13; 15; 17; 18; 19; 23; 59.
B21	Increased complexity,	3; 9; 14; 16; 48; 50.
B22	Lack of collaboration	3; 4; 5; 9; 10; 12; 13; 14; 18; 21; 22; 29; 30; 31; 35; 36; 40; 42; 50; 57; 58; 60.
B23	Hierarchies in organizational structures/inadequate organizational structure	3; 5; 7; 12; 14; 17; 18; 27.
B24	Unskilled labor	3; 4; 5; 6; 7; 9; 11; 12; 13; 14; 15; 17; 18; 19; 20; 21; 26; 28; 29; 30; 33; 34; 35; 40; 43; 44; 46; 48; 51; 54; 56.
B25	Inaccurate and incomplete designs and lack of application of the design constructability concept	3; 5; 6; 9; 10; 12; 14; 18; 24; 34; 47; 50; 53.
B26	Fragmented nature of the industry	1; 3; 5; 6; 10; 12; 14; 16; 29; 37.
B27	Traditional design approach	6; 8; 10; 12; 14; 18.
B28	Uncertainty in the supply chain	3; 8; 10; 12; 14; 18; 24; 31; 32; 35; 41; 57.
B29	Strict procurement and approval requirements	3; 5; 7; 14; 24.
B30	Additional cost and high inflation rates	10; 12; 14; 18; 21; 28; 29; 30; 32; 33; 36; 40; 45; 46; 47; 51.
B31	Long implementation period	6; 8; 10; 12; 18; 21; 46.
B32	Lack of stakeholder commitment	1; 3; 4; 5; 6; 7; 8; 9; 10; 12; 13; 14; 15; 17; 18; 19; 20; 22; 23; 26; 27; 29; 31; 34; 35; 40; 42; 46; 49; 54; 57; 60; 61.
B33	A suitable lean implementation approach remains to be defined	39; 44; 53; 59.
B34	Late decision making	3; 5; 8; 9; 10; 12; 18; 60.
B35	Deficiency in the flow and transparency of information	4; 5; 60.
B36	Centralized decisions	3; 5; 14; 60; 61.
B37	Focus on the product, not the process.	53; 57; 61.
B38	Exclusive focus on routine activities	60
B39	Lack of commitment and difficulty with teamwork	4; 6; 60.
B40	Lack of commitment from top management	1; 3; 5; 6; 7; 8; 9; 14; 17; 18; 19; 20; 22; 23; 27; 29; 35; 40; 46; 54; 56; 57; 60; 61.

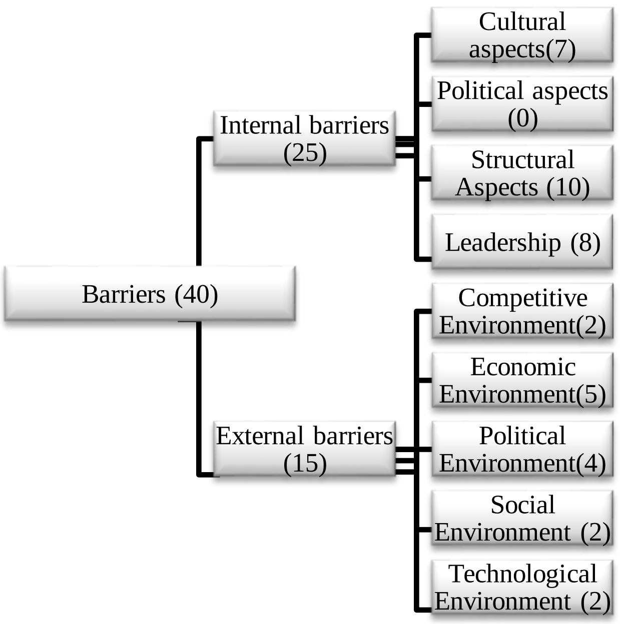
Source: Prepared by the Author

According to Bajjou and Chafi (2018), there are nine organizational barriers, with the main barriers to Lean Construction (LC) being the lack of knowledge about Lean philosophy, unskilled labor, and financial restrictions. Similarly, Ahmed; Sobuz (2020) identified 41 barriers to Lean Construction, highlighting the most significant barriers as the lack of knowledge and awareness about the philosophy, resistance to change, lack of good communication, lack of Lean skills and techniques, and the lack of management commitment.

Despite numerous studies on Lean Construction, the lack of awareness or knowledge about the philosophy's concepts remains one of the most persistent obstacles (Moyo & Chigara, 2021). Mano et al., (2023) point out that the wide range of barriers identified in the literature complicates the diagnosis of these obstacles within an organization.

For a clearer understanding of the nature and context of the barriers, they have been categorized as either internal or external. According to Pettigrew (1987), 'internal' refers to the organizational culture, structure, or political context that exists within the organization. In other words, these are the internal aspects through which ideas for change must navigate. 'External' context, on the other hand, refers to the environment in which the organization operates, encompassing the competitive, social, economic, and political landscape. The categorization of the barriers is illustrated in Figure 2.

Figure 2- Nature of the Barriers



Source: Prepared by the Author

The barriers to lean construction, corresponding to internal barriers, are linked to structural, leadership, and cultural aspects. These barriers encompass a lack of commitment from senior management, insufficient team commitment and challenges in garnering support, leadership resistance to change, and lack of good communication, as detailed in Table 2.

Table 2 - Internal Barriers

Internal barriers	**Nature**
Lack of a philosophy and long-term planning; High labor turnover; Inadequate pre-planning; Lack of planning for quality; Lack of evaluation of project performance or progress; Inaccurate and incomplete projects and lack of application of the concept of project constructability; Traditional design approach; Uncertainty in the supply chain; Lack of commitment from interested parties; Exclusive focus on routine activities.	**Structural Aspects**
Lack of focus and understanding of customer needs; Weak leadership and insufficient management skills; Lack of incentives and motivation and low professional salaries; Lack of clarity in objectives and values; Late decision making; Centralized decisions; Deficiency in the flow and transparency of information; Lack of commitment from top management.	**Leadership**
Lack of knowledge or awareness about lean construction philosophy; Resistance to change; Lack of green initiatives; Lack of standardization; Lack of good communication; Lack of collaboration; Lack of commitment and difficulty working as a team.	**Cultural Aspects**

Source: Prepared by the Author

The barriers that align with external factors are linked to the economic, political, competitive, social, and technological environment, as detailed in Table 3.

Table 3 – External Barriers

External Barriers	**Nature**
Financial restrictions; Project subcontracting; Unskilled labor; Additional cost and high inflation rates; Focus on the product, not the process.	**Economic Environment**
Lack of government support; Hierarchies in organizational structures/Inadequate organizational structure; Fragmented nature of the industry. Competitive Environment Time and commercial pressure; Increased complexity.	**Political Environment**
It remains to introduce and implement lean culture in the organization; A suitable lean implementation approach remains to be defined.	**Social Environment**
Lack of appropriate lean technology or tools; Long implementation period.	**Technological Environment**

Source: Prepared by the Author

5. Conclusions

Lean Construction is a waste reduction and continuous improvement philosophy applied to the construction industry, having been adopted in various countries. Although originating from manufacturing, certain aspects of the construction industry present challenges, acting as barriers to the implementation of Lean Construction. To address this, the study conducted a systematic literature review aiming to analyze and identify characteristics that obstruct or contribute to the failure of implementing Lean Construction.

The SLR resulted in 60 articles published between 2010 and 2023. Data extracted from these articles were systematically coded to meet the study's objective. The analysis identified 40 characteristics that serve as barriers to lean construction, including lack of commitment from senior management, hierarchical or inadequate organizational structures, insufficient leadership, lack of knowledge about Lean philosophy, and resistance to change, among others. To facilitate comprehension, these barriers were categorized based on their nature and the context in which they occur.

Thus, understanding and recognizing the challenges in implementing LC is crucial. It provides valuable insights for organizations to prepare effectively, ensuring the successful implementation of LC.

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