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MATURITY MODELS IN OFF-SITE CONSTRUCTION AND ANALYSIS OF LEAN INCORPORATION: REVIEW

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ABSTRACT

The adoption of off-site construction (OSC) is still uncertain although many contributions to its promotion have been made. In many studies, lean construction (LC) has been declared to be the most suitable approach to support managing OSC, but there are challenges regarding its incorporation into OSC. A maturity model (MM) has been proposed to evaluate and guide OSC adoption. However, the literature shows misunderstandings about the MM structure and how these models incorporate LC. This article aims to review maturity models (MMs) developed in the OSC field to identify benefits and deliver deep insight into their structure and the incorporation of LC. The methodology involved three steps: *(i)* systematic literature review (SLR) of OSC-MMs, *(ii)* thematic analysis to identify associations among MM benefits, OSC barriers, and LC challenges, and *(iii)* analysis and interpretation of results. The findings suggest that MMs developed in OSC are incipient, many of them suffer bias and have weaknesses in their structure, and LC incorporation is poor and not explicit in most OSC-MMs.

KEYWORDS

Off-site construction, prefabrication, lean construction, maturity models, barriers.

INTRODUCTION

Off-site construction (OSC) is an innovative type of construction that has been demonstrated to be more effective in overcoming the inefficiencies associated with traditional construction (Suliman & Rankin, 2021). OSC is also known as off-site production, industrialized construction, concrete prefabricated housing, and modern method of construction (Blismas et al., 2010; Dang et al., 2020; Liu et al., 2018; Wang et al., 2020). All these terms refer to innovative engineering systems in which significant portions of operations and construction elements are produced off-site in a factory environment before the final assembly on-site (Suliman & Rankin, 2021). The benefits of OSC adoption are related to improving quality, productivity, and safety, reducing labor intensiveness and construction time, and ensuring better sustainable performance (Dang et al., 2020; Suliman & Rankin, 2021; Wang et al., 2020).

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Despite all these advantages, the adoption of OSC still faces significant resistance (Nadim & Goulding, 2011), particularly in developing countries where adoption remains low (Dang et al., 2020). Previous studies have identified several OSC barriers that inhibit its adoption. In the current research, OSC barriers identified in the context of the Chilean architecture, engineering, and construction (AEC) industry are used as the main reference. According to Ortega (2022), low OSC adoption, to some extent, is attributed to the inability to objectively evaluate the benefits offered by OSC due to a lack of knowledge, technical skills, and experience related to this type of construction. In addition, all these challenges are enhanced in an AEC industry that is characterized by conservative behavior, in which innovative systems such as OSC seem to be a risk that many organizations do not need to assume.

In sum, OSC suffers from the ineffectiveness of successful measures to improve its project performance for organizations and a lack of adequate understanding of the system to understand the current level of adoption of the organization and how to improve it (Dang et al., 2020).

LEAN IN OFF-SITE CONSTRUCTION

The OSC approach differs from conventional construction methods (Bendi et al., 2021) in many aspects, such as the complexity of the buildings, manufacturing process, application of technologies, logistics system, planning, coordination, and control. This can be explained by the similarities between OSC and the manufacturing approach (Höök & Stehn, 2008). Therefore, the AEC industry must be prepared to adopt suitable manufacturing practices and be prepared to change old practices to enable this to happen (Mawdesley & Long, 2002). To this end, lean construction (LC) is a philosophy conceptualized at the beginning of the 1990s that came from the Toyota production system and aimed to meet the client's requirements (deliver value to customers). Comparable to OSC, lean construction is also an innovation in the AEC industry (Singh & Kumar, 2020) and is based on adapting manufacturing practices to construction. For this reason, LC has been mentioned in many studies as the most suitable approach to support the adoption of OSC.

The effectiveness of LC principles in OSC projects has been proven. Mawdesley & Long (2002) researched two case studies. All the projects involved the provision of multistory office blocks, and a different procurement system was adopted for each case. In the first case, a traditional procurement method and conventional practices were employed in the construction phase. In the second case, a lean approach, which consists mainly of the early incorporation of all stakeholders before the start of the design phase, was used. The results showed up to 98.3% improvement in factory productivity, a 50% reduction in on-site operations, and a 180% increase in on-site efficiency against the traditional procurement method (case Study I). Other studies have made positive alterations to the OSC production system to make improvements and implement lean tools. For example, Yu et al. (2013) implemented 5s, standardized work, takt time planning, variation management, and value stream mapping in a shelter production line. In only 6 months of implementation, significant improvements were achieved, including a 34% increase in labor productivity, a reduction in overtime of 15% of total man-hours, and a reduction of 15% to 2% in average staff and personnel absenteeism.

Notably, benefits for the AEC industry can be obtained in a short time by using OSC and LC together. However, empirical evidence highlights that it is not enough to just move to a factory environment to institute lean culture because OSC exhibits a project-based culture and the production setup, construction site, and temporary organization are similar to traditional construction (Stehn & Höök, 2008). Therefore, most implementations within LC in OSC are fragmented. Furthermore, there are still challenges that inhibit the adoption of LC, including complexities in understanding it, lack of strategies for implementing LC at the micro level (downstream players), and lack of guidelines for gradually introducing LC to the construction industry (Aslam et al., 2020). Addressing these issues might support a successful start to incorporating LC into OSC and the effective adoption of OSC in the AEC industry.

MATURITY MODELS AND OPPORTUNITIES

Maturity models (MMs) seem to be an ideal methodological tool for addressing the aforementioned concerns. MMs may facilitate OSC adoption and alleviate the challenges of clarifying LC incorporation into OSC. Since the introduction of MMs in the software manufacturing industry (Wang et al., 2020), MMs have been used in different fields (e.g., medical service, science, technology, and the manufacturing sector). MMs are used to assess the maturity of elements in the process to determine the maturity level reached by the system (Cano et al., 2020). In addition, this tool provides benchmarks (the current organization level), highlights paths to reach excellence (maturity gaps), and identifies goals or target levels (Suliman & Rankin, 2021). Consequently, several studies have employed MMs to assess the maturity of new technology implementations or strategies in the AEC industry (Razkenari & Kibert, 2022).

In sum, MMs deliver several benefits for organizations. For example, they enable organizations to know their ecosystem in terms of performance status, current capabilities, and what they need to achieve organizational goals by supporting the development of better management practices. Furthermore, this application makes it possible to reduce the competitiveness gap among construction firms and to deliver a differentiated, sustainable, and innovative value offer (Cano et al., 2020). All these arguments support the idea that configuring an MM based on LC as a suitable approach to achieve the requirements of OSC may mitigate the key barriers that inhibit OSC adoption and the challenges for the incorporation of LC.

This article aims to review the existing MMs in OSC to identify the potential benefits and determine the current structural gaps, the thematic areas they address, and the incorporation of the LC approach. In doing so, the paper has three specific objectives: *(i)* identify the benefits of MMs and their relationship to address the challenges that inhibit OSC adoption and the incorporation of LC into OSC; *(ii)* assess of the MMs that have been developed in the OSC field; and *(iii)* explore the potential research opportunities of OSC-MMs development through the systematic incorporation of LC into OSC.

METHODOLOGY

The primary method used in the current research is a systematic literature review (SLR). The methodological framework involved three principal stages: *(i)* systematic literature review of MMs in OSC, *(ii)* thematic analysis of MM benefits, OSC barriers and challenges to incorporating LC into the OSC field, and *(iii)* analysis and interpretation of the selected OSC-MMs. Figure 1 presents the entire research process.

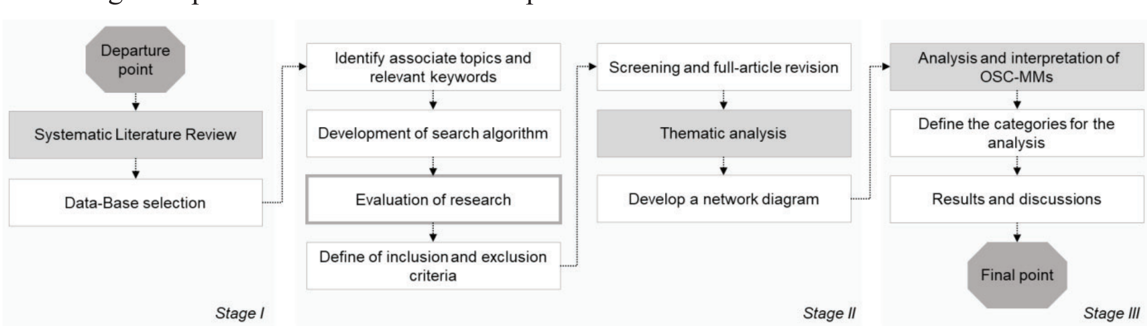

Figure 1: Research frameworks

STAGE I · SYSTEMATIC LITERATURE REVIEW

The SLR methodology is an objective, replicable and transparent tool that is used to examine the existing studies on a subject (Levy & Ellis, 2006). Furthermore, SLR has been used in the AEC industry to *(i)* establish the boundaries of existing research, *(ii)* identify potential future research considerations, and *(iii)* keep up-to-date with developments on a subject (Ibrahim Y. Wuni, Shen, & Osei-Kyei, 2019). Therefore, the authors adopted SLR because it helps organize and compile suitable studies to obtain information of interest and determine the main coinciding characteristics among them. The SLR approach comprised selecting the database, identifying the associated topics and relevant keywords, developing the search algorithm, defining inclusion and exclusion criteria, and evaluating the research.

Database, topics and keywords, and algorithm development

Once the research objective(s) was established, database selection was the next step in the SLR. According to Donthu et al. (2021), settling on one appropriate database is recommended to mitigate the need to consolidate information into a single format and minimize potential human errors. Therefore, the SLR was performed in Scopus, given the recommendations by other studies in the field of OSC construction management (Ibrahim Y. Wuni, Shen, & Mahmud, 2019). Moreover, Scopus has been mentioned as the research engine that covers more journals and recent publications than any other database (Aghaei Chadegani et al., 2013; Ibrahim Yahaya Wuni & Shen, 2020).

Next, a list of keywords was identified in the extant literature. This list comprised synonyms of "Off-site construction" and "maturity model". Then, to ensure coverage and to develop the search algorithm, the 'title/abstract/keyword' functionality of Scopus and the Boolean concatenator 'OR & AND' were used. The search algorithm contained the following: ("off site construction" OR "off-site construction" OR "offsite construction" OR "modular construction" OR "modular integrated construction" OR "prefabricated prefinished volumetric construction" OR "modern method of construction" OR "prefabrication" OR "prefabricated building" OR "industrialized building system" OR "industrialized building" OR "industrialized housing" OR "industrialization" OR "industrialised construction" OR "industrialised housing" OR "industrialisation") AND ("construction") AND ("maturity Model" OR "maturity" OR "model capability" OR "maturity grid"). The search was restricted to papers published between 2010 and 2022 and articles in the English language because it is the most widely used scientific language (Ibrahim Yahaya Wuni & Shen, 2020). In the end, 49 studies were retrieved.

Evaluation research: Inclusion and exclusion criteria

Inclusion and exclusion criteria were established to ensure that the retrieved research studies met the quality requirements (Ibrahim Yahaya Wuni & Shen, 2020). According to Tranfield et al. (2003), this step is relatively subjective and, to avoid any bias should be performed by more than one reviewer. Thus, two researchers with experience in OSC and MMs participated in this step. The main inclusion criteria involved *(i)* articles that develop a type of maturity model under the topic of OSC and *(ii)* articles that are published in a peer-reviewed journal or rated conference proceeding.

Screening and full-article revision

Based on the algorithm developed and inclusion/exclusion criteria, the authors screened the titles and abstracts of the 49 articles, which resulted in the inclusion of 10 articles. A duplicate check of the 10 items was performed, and no duplicates were found. Then, a full-text evaluation was employed, and a final list of 8 articles was included for further analysis and interpretation. The search was repeated before submission to ensure that important recently published articles were included in the study. No articles were added to the final sample. Figure 2 depicts the screening process through a flowchart.

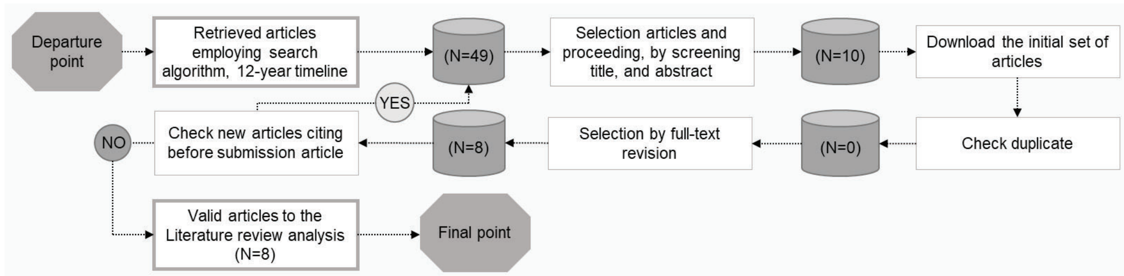

Figure 2: Article protocol selection

This stage was concluded with a complementary literature review to identify other benefits of MMs beyond those of the previously reported OSC-MMs and challenges prevailing in incorporating LC into OSC. The topics in Scopus included "LC challenge in OSC," "barriers to implementing LC," and "maturity model in construction." The OSC barriers were mainly taken from those identified in the Chilean AEC industry context by Ortega (2022) and from the articles chosen in the SLR.

Stage II · Thematic analysis

A thematic analysis was employed to identify in the literature the aspects regarding how the benefits of MMs can contribute to overcoming the barriers that inhibit OSC adoption and the incorporation of LC. Thematic analysis is a method that is used to identify, analyze, and report patterns (themes) within records (Braun & Clarke, 2006). To this end, the authors summarized and codified the most relevant benefits of MMs reported in the literature, mainly in the OSC field, and listed the fundamental OSC barriers and challenges that must be addressed to facilitate OSC adoption and the incorporation of LC into OSC. Then, a network diagram was built, wherein the nodes at the bottom represent the MMs benefits, and the nodes at the top represent the OSC barriers and LC challenges. Finally, the patterns among those variables were represented with arrows. This input supports the author's idea that MMs are a powerful tool that must be developed in the OSC field to help and facilitate its adoption.

Stage III · Analysis and interpretation

Stage III aimed to extract the relevant evidence from the final list of articles to support the analysis and interpretation of each OSC-MM. According to Broome (1993), to analyze and interpret information, each study that forms part of the literature review needs to be categorized, ordered, and summarized. Therefore, the authors established 6 categories for the analysis. If any article did not contain information in a category or subcategory, the label "no information" was employed. Table 1 shows the name and description of each category.

Table 1: Categories employed in the analysis and interpretation of OSC-MMs

Category	Subcategories	Description
Geospatial contribution	Article's location	Region or country in which the paper was developed.
	Publication's year	Year in which the article is available to the readers.
Maturity measure	Maturity levels	The scale is employed to measure the maturity level.
	Descriptors	Name of each maturity level.
Application areas	-	It is related to the dimensions targeted by the maturity model.
Analysis method	Qualitative (Qlt)	No weighting mathematical or statistical method is applied.
	Quantitative (Qnt)	A mathematical or statistical method is applied.

Weighting method	-	Approach to assigning value for dimensions or indicators that comprises the maturity model.
Lean construction adoption	Low level = "**0**"	LC adoption is low or imperceptible. Not explicitly stated by the author.
	Medium level = "**+**"	LC adoption is palpable. It does not necessarily have to be made explicit by the author.
	High-level = "**++**"	LC adoption is remarkable. The author explicitly states it.

RESULTS

Table 2 shows MMs' main benefits as a methodological tool. The review was conducted in the construction field, and special attention was given to the OSC area. The outcome was the identification of 11 benefits of MMs. Regarding OSC barriers and LC challenges, the authors detected six key (6) OSC barriers and four (4) LC challenges that can be effectively addressed by applying an MM base to incorporate lean construction into OSC.

Table 2: MMs benefits, OSC barriers, and challenges for the incorporation of LC within OSC

Item	ID	Description	Reference
MMs Benefits	MMb1	Allows identifying weak areas or gaps	[1] [2] [3]
	MMb2	Serves as a prescriptive tool for improving performance	[1] [2] [5] [13]
	MMb3	It is a tool to assess an organization's maturity (e.g., process maturity, product maturity, the skill of people, social system) and to assist in increased maturity level	[1] [2] [3] [4] [5] [6] [9] [13]
	MMb4	Assists in continuing improvement	[2] [3] [6] [7]
	MMb5	Helps managers to reach organizational or project goals	[1] [2] [6] [10] [13]
	MMb6	Helps to set prioritized goals	[1] [6]
	MMb7	Serves to assess the maturity of new technologies in the AEC industry	[6]
	MMb8	Helps to reduce the competitiveness gap among organizations	[10]
	MMb9	Promotes the creation of value	[10]
	MMb10	Serves as a comparative tool (e.g., benchmarks tool)	[1]
	MMb11	Establishes a common and shared language	[8]
OSC barriers	OSC1	Lack of understanding of manufacturing principles to be applied in OSC	[5] Cf. [9]
	OSC2	Lack of market maturity	[1] [3] Cf. [9]
	OSC3	Failures in the management of OSC projects	Cf. [9]
	OSC4	Insufficient project management skills	[9]
	OSC5	Poor project performance	[5]
	OSC6	Inability to assess the benefits offered by OSC	[9]
LC Challenges	LC1	Complexities in understanding LC	[11]
	LC2	Lack of appropriate lean technology or tools	[12]
	LC3	Lack of strategies to implement LC	[11]
	LC4	Lack of guidelines for introducing LC gradually into the industry	[11]

Note: **[1]** Suliman & Rankin (2021) **[2]** Wang et al. (2020) **[3]** Liu et al. (2018) **[4]** Wei et al. (2022) **[5]** Dang et al. (2020) **[6]** Razkenari & Kibert (2022) **[7]** Bendi et al. (2021) **[8]** Blismas et al. (2010) **[9]** Ortega (2022) **[10]** Cano et al. (2020) **[11]** Aslam et al. (2020) **[12]** Yuan et al. (2020) **[13]** Correia et al. (2017)

Following Table 2, through a network diagram, Figure 3 indicates the direct relationship between MM benefits and key OSC barriers and LC challenges. Almost five positive MM benefits would have an impact of mitigating one OSC barrier and one LC challenge at the same time. The benefits of MMs have addressed the overall key OSC barriers and LC challenges. This result suggested that MMs are a powerful tool for facilitating the adoption of OSC, especially in mitigating key OSC barriers that have been reported recently in developing countries.

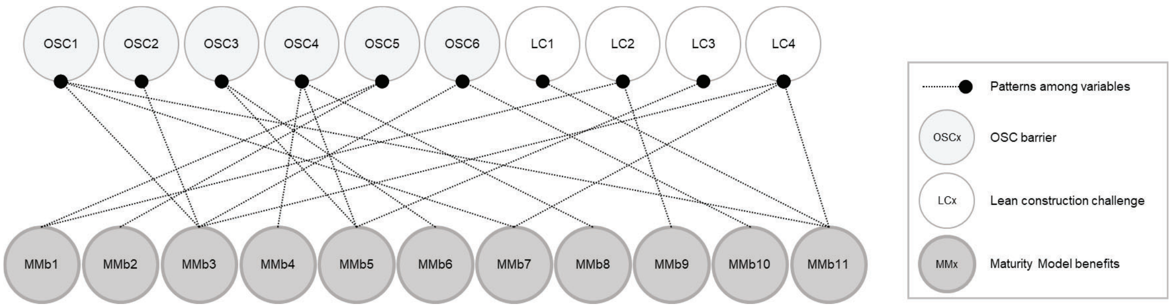

Figure 3: Benefits of MMs to overcome OSC barriers and challenges of LC incorporation.

ANALYSIS AND INTERPRETATION OF OSC-MMS

This section summarizes the SLR findings of the OSC-MMs identified. The results respond to the analysis and interpretation based on the categories established in stage III.

Geospatial contribution of MMs in the OSC field

Despite the potential positive impact of MMs on overcoming OSC barriers and LC challenges, as suggested in Figure 3, the geospatial contribution in the domain of MMs (Table 3) indicated a low level of development of this methodological tool in the field of OSC. Just only 8 OSC-MMs have been developed in the last twelve years. Moreover, every country and region has its realities, and many dimensions in the OSC field require doc treatment. Furthermore, it is not possible to establish a statistical trend in the development of MMs in the field of OSC over time. However, in the last 3 years, the authors observed an incipient development of this methodological tool of 2 MMs per year worldwide.

Table 3: Number of papers per year and geospatial contribution.

Location of development	Year												
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
International													1
Canada												1	1
India												1	
China									1		2		
Australia	1												

Structural key categories of OSC-MMs

The authors ordered the key categories that comprised OSC-MMs in Table 4. These categories support the inference that there is no unique way to build up MMs in OSC. For example, regarding maturity measures, some OSC-MMs comprise 3, 4, or 5 maturity levels. Additionally, most of them used different terminologies to describe each maturity level. Even one "MM" in the sample did not employ a descriptor for the maturity levels. The relevant contribution of maturity levels is clearly describing the path to reaching higher maturity levels. However, the findings suggested that not all authors gave a full explanation. These outcomes correspond to those of reviews carried out in other construction areas, e.g., sustainability (Correia et al., 2017).

Table 4: Key categories that constituted OSC-MMs

ID	Levels	Descriptors	Application areas	Analysis Method		Weighting Method	LC adoption
				Qlt	Qnt		
[1]	5	1.Limited 2.Promising 3.Adopted 4.Implemented 5.Accepted	Technology and engineering methods	✔	✔	No information	+
[2]	4	1.Initial 2.Upgraded 3.Integrated 4.Optimal	Enablers: leadership, participants' capabilities and collaboration, planning, and control, technology and schema Results: product, society, organization, management, and control	✔	✔	Analytic Hierarchy Process (AHP)	+
[3]	5	No information	The procurement process, operation efficiency, relationship coordination and strategy alignment, and corporate social responsibility	✔	✔	No information	+
[4]	5	1.Initial 2.Repeatable 3.Defined 4.Managed 5.Optimized	Data Structure, Data Inflow, Virtual Twin Modeling/Decision-Making, Data Outflow	✔	✔	No information	+
[5]	5	1.Very low 2.Low 3.General 4.Good 5.Very good	Technology, operation management, sustainable construction, and economic	✔	✔	Fuzzy Analytical Hierarchy Process (FAHP)	+
[6]	4	1.Explore 2.Initiate 3.Control 4.Optimize	Technological, functional, and organizational components	✔	✔	No information	+
[7]	3	1.Low 2.Medium 3.High	Operational challenges, broad execution strategy, planning certainty, and operational efficiency	✔		No information	+
[8]	-	No information	Cooperative innovations in prefabrication	✔		No information	+

ID= Identification of the research authors corresponds to the same ID used in Table 2.

LC adoption: Low level = "0," Medium level = "+," High-level = "++".

Regarding "application areas," the scope of MMs is variable. Researchers focused on a particular area of interest, which can be at the level of process or product, e.g., technological capabilities, operation management, procurement process, construction sustainability, or the product's design-production-logistic-maintenance. Most MMs for the analysis method included both quantitative and qualitative approaches. This approach helps to provide mathematical measurements of the maturity assessment and an in-depth understanding of each level. However, no consensus or standard concerning the weighting method applied in MMs exists. Therefore, even most MMs did not include this approach. The weighting method refers to the criteria for assigning a value to each dimension and indicator that was used to build each MM. This helps determine the preponderance of one application area over another (cf. Wang et al., 2020), and the intention is to eliminate the difficulty in obtaining practical data and the subjective nature of expert evaluation (Dang et al., 2020). A few studies have employed the analytic hierarchy process (AHP) or fuzzy analytic hierarchy process (FAHP) to evaluate MMs.

The evaluation outcomes related to LC adoption are aligned with expectations due to similarities between OSC and LC. All studies, to some extent, present management practices or tools belonging to LC. For instance, various studies have established the adoption of BIM, virtual design, or simulation as a minimum standard for incorporating OSC. Additionally, the early integration of the value chain to develop an integrated design and construction is also considered an initial maturity level in OSC adoption. More than half of MMs (e.g., [2], [3], [5], [6], [8]) include explicit mentions of LC to make a comparison with some of their own concepts or just to encourage its use. For example, training the workforce based on lean concepts is recommended to facilitate the improvement in production and construction in situ (Razkenari & Kibert, 2022). However, what should be learned, how, and when is not explicit. In other words, there is no clear explanation of how to implement LC in those MMs that promote its use.

DISCUSSION

MMs have certain limitations. For some MMs, a scale of maturity level or maturity level descriptors was not developed. Instead, applying qualitative analysis methods was the only focus, making it difficult to generate numerical indicators to assess maturity. For a few, a weighting method for the framework's dimensions and indicators was adopted. This suggests that most of the MMs had a significant degree of subjectivity and bias.

In most studies, the incorporation of LC in the dimensions/indicators of the OSC-MMs must be inferred. Consequently, determining the objectives and functionalities of LC practices and tools in the MMs frameworks is not provided. Therefore, the challenges of "complexities in understanding LC" (LC1) and "lack of appropriate lean technology or tools" (LC2) are not resolved. In contrast, this lack reinforces these challenges since it sets off a critical ambiguity space due to the variety of terms that are often used to explain the same concept and assumptions that must be made to select the appropriate LC practice/tool. For example, the transportation component is conceptualized regarding the assurance and efficiency of component transportation, considering distances, storage, and availability. This is associated with LC's "just in time" (JIT) management practice, which could have been standardized under this term. Such a divergence of terms contributes to a "lack of understanding of manufacturing principles to be applied in OSC" (OSC1). This scenario in a sector that is characterized by being conservative and volatile promotes the entrenchment of the known (e.g., traditional construction practices). It, therefore, transfers old vices to the OSC field.

Creation value-oriented management is an essential characteristic of the LC approach (Koskela, 1992). An important finding is that none of the OSC-MMs presented performs a *value analysis* regarding the dimensions that comprise each MM framework. Most of the proposed dimensions are taken from the literature, interviews, or workshops but do not have a *value analysis* to guarantee that the proposed dimensions meet internal (organization) and external (customers) requirements. Therefore, a vital principle of LC is not considered in the confection of MMs.

CONCLUSIONS

In this research, an SLR of the MMs developed in the OSC field using the Scopus database was conducted, and the level of LC incorporation in those OSC-MMs was evaluated. The literature review results showed poor development of this approach in the OSC field. Only 8 OSC-MMs have been developed in the last 12 years in a few countries. Furthermore, the incorporation of

LC showed weaknesses in terms of establishing a common language, providing clarity in the applications of LC practices and tools, and conducting an explicit and integrated framework for the adoption of LC. The authors identified that the OSC-MMs comprise transversal dimensions across the AEC industry at the global and local levels since each region has different "financial and market conditions" and "policies and regulations." This scenario confirms the idea of the poor availability of OSC-MMs. Moreover, the network diagram highlights how MM benefits can positively impact overcoming key barriers that inhibit OSC adoption. Therefore, the use of a powerful tool to facilitate OSC assessment, measurement, and adoption is lacking.

The analysis showed that application areas addressed by MMs are diverse and not directly associated with OSC phases in most cases. Based on this, the authors found the need to promote the development of OSC-MMs from two perspectives: *(i)* considering the project life cycle and *(ii)* using LC as a main approach to avoid any room for ambiguity. In addition, the authors suggest that in future developments of OSC-MMs, a *value analysis* of their dimensions/indicators should be performed as a complementary method of validating the model.

Despite its contribution, the study has certain limitations. The review includes research articles or proceedings. Other types of documents in which a kind of MM could have been developed to measure OSC maturity were not considered. Although some researchers recommend using one database, the authors suggest that a more extensive review, including other recognized databases in the scientific field, must be employed. Additionally, this paper mainly focused on exposing the weaknesses regarding incorporating LC into OSC-MMs. Therefore, future research should develop a comprehensive review of the LC critical coincident factors that have been included in the current MMs. This will be a baseline for further OSC-MMs development and facilitate incorporating LC practices or tools. Nevertheless, future revisions can take the current revision as a starting point to address the stated limitations.

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