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The Supply Chain Management Mechanism for Materials Procurement in The Construction Industry

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Abstract

Supply chain management is now widely used in business, especially in the manufacturing sector. The same principles being applied to the construction industry demonstrates how pervasive and persistent issues are. Since building materials are essential to the construction industry and are used in all types of projects, regardless of the client's original concept, the significance of this study is on the manufacturing of building materials. Although supply chain management appears to be a complicated system comprising numerous vendors, contractors, and subcontractors, it holds great promise for achieving the successful integration of different disciplines and stakeholders. The supply chain management for building materials is being examined using a quantitative methodology. The capability of procurement to allocate resources in a way that supports organizational dynamics and policy. As a result, the greatest mean value (4.37), which represents the range of the variables, best captures the individuality of construction projects (the construction of each project is different in size, resources, and implementation on method). The respondents all agreed that the range of factors influencing supply chain management, which has the highest mean of these features, is what makes construction projects unique. An inadequate organizational structure came in third with a mean of 4.30, trailing only the absence of an acceptable information technology system, which came in second with a mean of 4.36. As a result, supply chain management and procurement is a hotly debated subject for raising performance and quality. Several companies or organizations need the computer-based system to test the most recent supply chain management techniques as part of future research. A technique for the effective and efficient control and monitoring of the purchasing function is procurement that buys performance.

Keywords: Procurement, Supply Chain Management, Mechanism, Material, Construction Industry

Introduction

Decision-makers may have to make trade-offs between a supplier's low-quality product and a better, more dependable delivery time with another's uncertain delivery time and high-quality product. It has long been believed that uncertainty is a crucial part of the decision-

making process (Kaviani et al., 2019). According to grey-Shannon entropy, the four most important factors for evaluating suppliers are risks, relationship closeness, technical level of the supplier, warranty level and experience time, which are regarded as the most important and determining factors for supplier evaluation (Kaviani et al., 2019).

A number of criteria, including their relative importance, influence the choice of a procurement mechanism and its practices. These will make it easier to choose the appropriate procurement strategy to use.

Production quality, stable delivery, demand change in time, service, pricing, delivery performance, technical ability, manufacturing capability, financial position, and lead-time were utilised as decision factors (Chang et al., 2009). Collaboration, environmental investment, resource availability, environmental management, research and design activities, and green purchasing were all taken into account (Gupta & Barua, 2017).

The construction business is one of the oldest in the world, and it has been acknowledged for being traditional and still developing in a number of areas, including supply chain management and information technology innovation. Initially described as the integration of end-user business processes through a primary provider who offers goods, services, and information that add value to clients, Hasim et al (2018) claim that supply chain management first appeared in 1982.

Therefore, delays in the design process, delays in the awarding of subcontracts, delays in the procurement of materials, delays in the awarding of subcontracts, delays in the management and control of subcontractors, and delays in communication and coordination are all factors in the delay.

The value of the client's prompt approval for the documents permits the following phase to start as soon as possible and prevents any standby by the consultant or the construction contractor, even though Hamzah et al (2011) views this procurement stage as being of utmost importance. It was corroborated by Le-Hoai et al (2008), which claimed that the Client's modifications during execution resulted in extensions and deviations to the original timetable as well as additional delays and excessive expenses.

Literature Review

Comparing the operational regions of the supply chain in the manufacturing sector to those in the construction industry, supply chain management has also been extensively studied in academic literature. Supply chain management is the effective management of supply chain operations, and it is carried out in order to maximise customer satisfaction and secure a long-term competitive advantage. It demonstrates a focused effort on the part of supply chain management firms to build and manage supply chains in the most trustworthy and effective way possible. All building processes are represented by the construction supply chain. Papadopoulos et al (2016) state that the initial client/owner standards for design, building, repair, replacement, works, and subsequent demolition should be followed.

The management of materials in the construction industry is now fragmented, with inadequate communication and ambiguous roles for the parties involved. The division of design and construction, a lack of coordination, and poor communication have all contributed to a large amount of fragmentation. Time delays, higher prices, and unhappy owners are just a few of the negative effects of this. The system is crucial to the procurement of subcontracting and material is an efficient construction environment. The supply chain is typically involved during construction planning and scheduling.

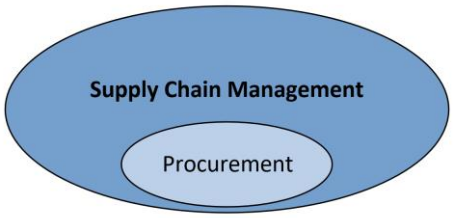

Figure 1 **:** Procurement function part of Supply Chain Management
Source : Self-developed by author(s)

Factor Affecting Supply Chain Management for Materials in Construction Industry

According to Jo et al (2018) Supply Chain Management is difficult to implement in the construction sector because it requires controlling a sizable and active group of institutions that operate to meet a number of different and incompatible business objectives. The main problems caused by the restricted and independent regulation of the construction supply chain manifest themselves at the intersections of various participants or phases. Love et al (2004) assert that the building industry is highly fragmented. As an illustration, the separation of design and construction, a lack of coordination and integration across various functional disciplines, and poor communication are all major impact factors that contribute to performance-related problems like low productivity, cost and time overruns, conflicts, and disputes.

Methodology

The tool used to gather the data required for the research study was an online questionnaire survey. Malaysia will be the location of the research. It will be the respondent who G7 of the contractor, which is listed with CIDB. using fundamental statistical techniques like rank, frequency, percentage, and mean. To assess the information gathered from each responder,They will use a 5-point Likert-type score to evaluate the questions. When analysing the basic statistical techniques like percentage or average value will also be utilised to analyse the results. Additionally, the Statistical Package for Social Science (SPSS) Software Version 29.0 will be used to evaluate the data collected 2019. The researcher's final step is to compile a summary based on the study's goals and final findings. Additionally, the researcher has the right to offer sensible suggestions for additional investigation on the subject at hand. For use in their own research, researchers might use information that has already been obtained from primary sources as secondary data.

Analysis and Findings

There were 105 questionnaires issued because, according to CIDB statistics, there are more than 800 G7 Contractors registered throughout Malaysia. There 92 people responded to the questionnaire out of the 105 that were provided. As a result, these questionnaires have a response rate of 88% or more than 20% of the population.

Factors Affecting Supply Chain Management for Construction Materials

The purpose of this section is to see if the respondents are aware of the issues that affect supply chain management in the construction industry. This is significant because it quantifies the issues that arise when materials supply chain management is used in the construction sector.

Table 1
Summary of factors affecting the Supply Chain Management for construction materials

No	Variables	Mean	Rank
1	The uniqueness of construction projects (each project's construction is different in size, resources, and implementation on method)	4.37	1
2	Lack of appropriate information technology system	4.36	2
3	Inappropriate organization structure to support system	4.30	3
4	The uncertainty and frequent changes of construction projects (the changes usually from commands of owner lead to the change of project implementation on plan)	4.15	4
5	Lack of awareness of the benefits and importance of adopting supply chain management in the construction industry	4.03	5
6	Lack of understanding of supply chain management	3.98	6
7	The complexity of projects (because there are many components involved for supply chain)	3.96	7
8	Lack of initial preparation of organizations involved in the project's supply chain	3.83	8

The highest mean value for the variables range is 4.37, which is the uniqueness of construction projects (the construction of each project is different in size, resources, and implementation on method). From the highest mean of these factors affecting, the respondents completely agree that the uniqueness of construction projects is the number of factors that affect supply chain management. Followed by that, lack of appropriate information technology system with the second highest mean (4.36), while inappropriate organizationalstructure to support system is the third highest mean value with 4.30. To sum up, those variables were the top three (3) factors affecting supply chain management for construction materials in infrastructure projects. Zulhumadi et al (2013) agreed about the responders may find it difficult to understand the offered objects and concepts because the basic Supply Chain Management concept has not yet been established in the construction industry, especially in Malaysia. Therefore, help was needed to complete the questionnaire. Supply Chain Management was barely known in Malaysia's building industry.

Result and Discussion

The result of the questionnaire that highlighted which made to improve the management of materials in the supply chain is shown as Table 2 below.

Table 2
Suggestion to improve the Supply Chain management for materials in construction industry

No	Variables	Mean	Rank
1	Our executives demonstrate willingness to change our way of doing business in order to mature in supply chain management	4.64	1
2	Schedule development analyzing activity sequences, activity durations and resources requirements to create the project schedule	4.63	2
3	2 My organizations recognizes the benefit that are possible from implementation of supply chain management	4.63	2
4	Authorizing the supply chain management for our firms	4.54	3
5	There is a relationships between firms and their suppliers during the supply chain process	4.50	4
6	4 It is important for my organizations to implement supply chain management	4.40	5
7	The executives in my organization have a good understanding of the principles of supply chain management	4.32	6

Table 2 discover suggestions that are made for improvement in managing the materials supply chain in the construction industry. Top three with the highest rank with mean values of 4.64 and 4.63. Our executives demonstrate willingness to change our way of doing business in order to mature in supply chain management rank first of strongly agreed with this recommendation achieving the mean value of 4.64.

Both second and third rank share the same mean value 4.63, which are schedule development analyzing activity sequences, activity durations, and resources requirements to create the project schedule and my organization recognizes the benefit that are possible from implementation of supply chain management. The suggestion about authorizing the supply chain management for their firms got the mean value 4.54 After that, there is a relationship between firms and their suppliers during the supply chain process has the mean value 4.50. Followed by that, there is only less by 0.10 mean value explained before, the suggestion is the important for the respondents organizations to implement supply chain management (4.40 mean value). Lastly, the last recommendation accompanied by lowest mean value 4.32 is the executives in respondents' company have a good understanding of the principles of supply chain management. As a consequence, the contractors largely agreed with the ideas and suggestions because they believe they will make it easier for them to learn more about supply chain management in the construction sector.

Conclusion

Implementing supply chain management in the construction industry is challenging because it requires controlling a large and active set of institutions that serve to meet a number of needs.company goals that are conflicting and divergent. the limited and independent management of The building supply chain creates significant issues at the intersections between several phases or participants. Among other things to take into account is the general supply chain.There is still no defined management in the construction sector, notably in Malaysia. The highest recommendation shows that the response executive has a desire to change the way they conduct themselves in order to advance in supply chain management

for building materials. This is due to the fact that the contractors discovered they were unaware of the benefits of supply chain management for materials in the building business. One of their execs would be willing to have solid knowledge about it.

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