Effect of Supply Chain Management the competitiveness of the construction industry

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Abstract. The world of construction has increased rapidly but is still far from optimal. For example, the portion of external construction services in Indonesia is still quite significant, accompanied by development performance that is far from adequate and efficient. It is also undeniable that the role of the economy can also be felt in terms of employment potential, material needs and effects, public regulations that support the economy and including the influence of the expansion of the construction industry that is sustainable with commercial distribution to the community. The following research is included in the applied research category or applied research, namely, research aimed at solving problems faced by managers in the work environment. The authors use descriptive and explanatory research methods. The purpose of this study is the implementation of Supply Chain Management (SCM) to the contractor, to determine the competitiveness of the construction industry at the contractor, and to know the effect of SCM on the contractor, which is influenced by the level of competitiveness in the construction industry. The results show that there is a positive and significant influence of SCM on the competitiveness of the construction industry at the contractor.

1. Introduction
The world of the construction industry is one of the most dynamic world compared to other sectors, especially in developing countries like Indonesia. Changing market conditions, relatively short construction periods, and fluctuations in material prices that are very difficult to predict require strong management skills and useful knowledge. Industry in construction services is all parties connected with the construction processes, also includes professional workers, the construction field, and also suppliers who work together to meet the needs of workers in the industrial field, whereas construction services are services that produce physical infrastructure and facilities. These services include study activities, technical planning/design, realization and monitoring, and maintenance. The industry in construction services can also be felt in terms of employment, the material needed and any effects, public regulations that drive the economy, and the effect on expansion in the construction industry. “A supply chain formed from interconnected Organizations, Sources, and processes that shape and deliver products and services to end consumers. Where this supply chain includes all facilities, functions, and activities related to the production and delivery of products or services, from suppliers to consumers” [1]. “A group of interrelated company participation adds value to the flow of changes in inputs from their original source to the final product or service demanded from the intended end customer. The supply chain is formed and can only be formed if there is more than one participating company” [2]. So that organizations can
compete and have excellent organizational performance, they can be supported by implementing SCM. SCM is a set of approaches to minimize the integration of suppliers, producers, storage warehouses until the goods are processed and distributed in the appropriate amount of purpose, location, time to reduce costs, and spoil customers. “SCM is an organizational system that involves a process that connects the beginning and end in various activities that provide added value in the form of products or services to consumers” [3]. “SCM is a way or an approach in managing the flow of product, information and material integration processes involving several parties from the beginning to the end consisting of suppliers, factories and distribution networks and logistics services” [4]. “SCM can also be said to maintain information processes, goods, and services from suppliers to consumers using an integrated system approach” [5]. “Integrated activities to obtain materials and services to convert them into faulty goods and finished goods and send them to consumers. This activity is a purchasing process, and outsourcing activities are combined with other functions to maintain the relationship between suppliers and distributors” [6]. From the definition of SCM above, it can be concluded that SCM is a method that integrates the management of information flow, products, goods, and services in the supply chain function with an integrated approach. From within, the SCM may include the determination of 1. Transportation, 2. Transfer of credit and cash, 3. Suppliers, 4. Distributors and Banks, 5. Debt and Receivables, 6. Warehousing, 7. Fulfilment of orders and 8. Distribution of information about forecasting on demand, production, and activities on inventory control. Where the aim is to create a supply channel that concentrates on increasing value to customers. “Managers who aim to strengthen the equality of relationships between companies and staff and throughout the supply chain may have a beneficial impact on organizational efficiency” [7]. “Mapping the supply chain gives the project structure, provides a clearly specified audit trail, can be used to evaluate workflows and distributed workflows, and allows for the opportunity to identify ways to minimize errors and increase the quality of the supplied space goods” [8]. “Supply chain is all operations directly or indirectly involved in the execution of a client's order. A simple supply chain is composed mainly of 5 phases (supplier, manufacturer, distributor, retailer, customer)” [9]. “It has been identified that the supply chain structure is a major influence on supply chain management and can improve company performance” [10]. “Relationship-based maps are the point of departure for defining main supply chain stakeholders and are used for resource management within the network organization” [11]. “To boost supply chains ‘effectiveness and handle threats and future risks, businesses are making efforts to enhance resilience and reduce supply chains' vulnerability” [12].

2. Research methods
The technical method used is in the form of a literature review, field research (observations, interviews, and questionnaires). The following research is included in the category of applied research or applied research, namely, research aimed at solving problems faced by managers in the work environment [13]. This research was conducted to support SCM to the competitiveness of the construction industry. The object of this research as the independent variable (X) is SCM. While the dependent variable (Y) in this study is the competitiveness of the construction industry. [14] This research uses descriptive methods and quantitative approaches. The data used are primary data from contractors in West Java. Sampling is done by purposive sampling technique. In this case, there were 20 contractor respondents. This study uses a questionnaire method with a Likert scale. The tools used for hypothesis analysis are validity and reliability test, linear regression analysis for hypothesis testing using significance tests.

3. Results and discussion
Before the analysis phase, the initial step is to test the validity and reliability of the research data to measure the instruments used in the study. Next is to group the research data. Characteristics of respondents in this study can be seen in the following table 1. Based on the characteristics table of the respondents (table 1), 45% of the respondents came from small contractors. While the characteristics of respondents based on the operational period, 60% of respondents have been operating> 5 years (table 2). After testing the validity and reliability, the research
data is declared valid and reliable. Next is to do a linear regression analysis to test the hypothesis that there is an influence of SCM as a variable X to the competitiveness of the construction industry as a variable Y. The results of the analysis of linear regression are set out in the following table 3.

**Table 1.** Characteristics of respondents based on contractor qualifications.

| Contractor Qualifications | Frequency | Percentage (%) |
|---------------------------|-----------|----------------|
| Small                     | 9         | 45%            |
| Intermediate              | 6         | 30%            |
| Big                       | 5         | 25%            |
| Total                     | 20        | 100%           |

**Table 2.** Characteristics of respondents by operational contractor duration.

| Period Operational | Frequency | Percentage (%) |
|--------------------|-----------|----------------|
| ≤ 5 Year           | 8         | 40%            |
| > 5 Year           | 12        | 60%            |
| Total              | 20        | 100%           |

**Table 3.** Summary model.

| Model          | R       | R Square | Adjusted R Square | Std. The error of the Estimate |
|----------------|---------|----------|-------------------|--------------------------------|
| a. Predictors: (Constant), X | **.992** | **.984** | **.984** | .05248 |

Table 3 shows the correlation value between the SCM (X) variable and the competitiveness variable of the construction industry (Y), which is equal to 0.992. Based on the interpretation of the correlation coefficient table, this value shows that there is a substantial relationship between the SCM (X) variable and the competitiveness variable of the construction industry (Y) because it is at an interval of 0.80 - 1.00.

The coefficient of determination shown by the value of R Square in Table 3. The calculation results show the value of the ratio of confidence that is the influence of the SCM (X) variable on the competitiveness variable of the construction industry (Y) of 98.4%.

**Table 4.** ANOVA calculation results in.

| Model            | Sum of Squares | df | Mean Square | F    | Sig. |
|------------------|----------------|----|-------------|------|------|
| a) Estimate: (Constant), X | 3.138          | 1  | 3.138       | 1139.437 | .000 |
| b) Dependent Variable: Y    | .050           | 18 | .003        |      |      |
| Total             | 3.187          | 19 |             |      |      |
Based on the calculation results shown in Table 4, the calculated F value is 1139.437 (Sig F = 0.000). With an α value of 5%, F arithmetic > F table (1139.437 > 3.55) and Sig F < 5% (0.000 < 0.05), then there is a significant influence of the SCM (X) variable on the competitiveness variable of the construction industry (Y).

Table 5. Coefficients results.

| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|-------|-----------------------------|---------------------------|---|-----|
|       |                             |                           |   |     |
| 1     | (Constant)                  | -.017                     | .119 | -142 | .889 |
|       | X                            | .978                      | .029 | .992 | 33.756 | .000 |

Table 5 shows the coefficient values that form a linear regression model between the SCM (X) variable and the competitiveness variable of the construction industry (Y), with the model Y = -0.17 + 0.978X + e. The interpretation of the model is as follows:

3.1. \( b_0 = -0.17 \)

The constant of the regression model is shown by the value of -0.17, meaning that without the contribution of the SCM (X) variable, the value of the competitiveness variable of the construction industry (Y) is -0.17.

3.2. \( b_1 = 0.978 \)

This regression coefficient shows the amount of contribution made by the SCM (X) variable to the competitiveness variable of the construction industry (Y). SCM (X) variable regression coefficient has a positive value, meaning that every 1 unit increase in the SCM (X) variable will raise the construction industry (Y) competitiveness variable by 0.978.

4. Conclusion

Referring to the results of research, discussion, analysis and testing of hypotheses, it can be concluded that there is an influence given from the SCM (X) variable on the positive and significant variable of the competitiveness of the construction industry (Y), with an indication of \( \alpha < \text{significance value that is} 0.05 < 0.000. \) The coefficient of determination, which shows the impact of the variable SCM (X) on the variable industry competitiveness on construction (Y), amounting to 98.4%.

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