Purchasing Strategy of Small-sized Contractors for Building Projects in The Greater Bandung Areas

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Abstract. The purchasing strategy of commodities in a construction project is one of the things that determine the success of a project. Commodities in construction projects are very diverse, thus the commodity purchasing strategy will be focused on strategic commodities. Important strategic commodities are determined by contractors in managing logistics to support the implementation of the projects they are working on. This paper discusses the purchasing strategy for small-sized contractors who are usually working on building projects in Greater Bandung areas. The methodology used for this study were identifying strategic commodities by conducting a survey of 10 small-sized contractors in Greater Bandung areas, getting an assessment of strategic commodities, and to trace the historical data of the project, confirming the value of purchasing strategic commodities, then analyze the appropriate purchasing strategy by doing literature review while considering the nature of strategic commodities. The results of the study show that strategic commodities in buildings are sand, cement, concrete, reinforcing steel, brick, and glass.

Keyword: purchasing strategy, small-sized contractor, building projects, strategic commodities

1. Introduction
Commodity purchasing in construction projects is in the range of 60-80% of the total value of construction [1]. The great value of purchasing construction commodities makes it need to be considered in making commodity purchasing. Project success is determined largely by making the most appropriate purchasing decisions and having the ability to coordinate different suppliers. The right purchasing decision and coordination are part of the company's purchasing strategy [2].

Small-sized contractors are vulnerable to changes in the company's cash flow. Some of the problems experienced by small-sized contractors are the problem of commodity cost fluctuations [3]. One of the factors to reduce commodity cost fluctuations is a good purchasing strategy
The consideration of choosing suppliers for purchasing commodities prioritized by small-sized contractors is location, price, speed, and quality of suppliers.

The type of dominant work carried out by small-sized contractors is the construction and renovation of simple buildings, rehabilitation of road infrastructure, and specific occupational specialties [5]. The purchasing strategy cannot be done on all types of building construction commodities so that the purchasing strategy will be focused on strategic commodities, which are large-value commodities and in the long term the availability of commodities will affect the construction process [6].

This paper discusses the study of suitable purchasing strategies for small-sized building contractors in the Greater Bandung areas. The expected results of this study are in the form of recommendations on strategic commodity purchasing strategies for small-sized contractors in Greater Bandung areas and are expected to provide benefits to small-sized contractors, as input to improve commodity purchasing systems and take strategic steps on commodity needs.

2. Literature Study

2.1 Kraljic Matrix

The definition of strategic commodities is a commodity that has a large value and in the long term, the availability of commodities influences the production process, in this case, the process of implementing construction [6]. Strategic commodities are closely related to existing purchasing practices in companies [8]. One of the main steps in the purchasing process involves identifying and selecting suppliers whose costs, quality, technology, timeliness, dependency, and best services meet the needs of the organization. Strategic commodity purchasing takes a strategic approach to supplier selection - an approach that is more aligned with organizational strategy. The strategic purchasing for commodities is not only applied at one time but needs sustainability to ensure that supply remains despite changes in the company's internal and external environment.

Kraljic introduced the first portfolio that explained purchasing and supply management. Kraljic [6] compiled a portfolio matrix that classifies products based on 2 dimensions, namely value and supply risk (low and high). Kraljic matrix has been widely used in different industries as an efficient tool for developing different purchasing strategies. Until now the matrix in the first portfolio of Kraljic is the best practice to determine strategic commodities by many industrial companies. Strategic commodities are important to be applied to contractors because they do not allow contractors to manage all types of construction commodities, and are not effective when contractors focus on commodities that have small value or their existence in construction is not too important.

Commodity classification is divided into two vectors, namely risk and value. The following is a description of the classification based on vectors:

![Kraljic Matrix](image)

**Figure 1. Kraljic Matrix (Kraljic, 1983)**
Leverage: Low risk with high value. In this condition, many alternative suppliers and commodities are easily found on the market, but goods cannot be replaced with alternatives (high-value commodities). At this level, the commodity can be considered safe because it has many suppliers.

Strategic: High risk with high values. In this condition, suppliers are not many, commodities are rather difficult to find on the market, and commodities are difficult to replace with other alternative commodities. At this level the commodity needs more attention because the difficulty of finding suppliers can cause disruption to construction projects.

Bottleneck: High risk with low value. In this condition, suppliers are not many and commodities are rather difficult to find on the market, but commodities can be replaced with commodity alternatives when allowed by the project owner. At this level, the commodities need to be considered because the commodity market can be said to be monopolistic with a few of suppliers.

Non-critical: Low risk with low value too. In this condition, there are many alternative suppliers, commodities are easily found on the market, and commodities can be replaced with commodity alternatives when allowed by the project owners. At this level, the commodity does not need to be considered because the commodity market is very free and it is easy to find alternatives.

2.2 Purchasing Strategies
The contractors need to have purchasing or purchasing strategy to improve efficiency in commodity management. The purchasing strategy for each commodity varies, but one way that can be done is to identify commodities that are strategic then adjust their purchasing strategies [9]. There are several ways to manage purchasing strategies based on the quadrant in the Kraljic matrix as follows:

1. Strategic
   a. Maintaining strategic partnerships: To offset supply risk, the company builds partnerships with its suppliers. Mutual trust and commitment related to intensive relationships tend to reduce the risk of supply to a minimum. Close collaboration with suppliers will lead to improved product quality, delivery reliability, a grace period, product development, product design, and reduced costs. This situation can be characterized as one with balanced strength between buyers and suppliers.
   b. Accepting locked partnerships: This strategy often occurs when buyers are subject to unfavorable supplier conditions and cannot withdraw from the situation. The locked position may be due to the fact that the supplier holds a patent for a particular product and therefore has monopoly power to a certain extent. This situation can be categorized as a situation dominated by suppliers.
   c. Stopping partnerships: This strategy is used when supplier performance becomes unacceptable and irreparable. Buyers will try to reduce their dependence on suppliers. One way to achieve this is to find alternative suppliers. In this situation the buyer still depends on the supplier.

2. Bottleneck
   a. Accepting dependency, reduce negative consequences: The main focus of this strategy is to ensure supply even with additional costs if necessary. By conducting risk analysis, companies can identify the most important bottleneck products and consider their implications.
   b. Reducing dependency and risk, find other solutions: This strategy is directed at reducing dependence on suppliers. The most common way to achieve this is to expand product specifications or find new suppliers, and replace with other alternative commodities.

3. Leverage
   a. Exploiting purchasing power: In this strategy the company pursues competitive offers.
Because suppliers and products can be exchanged, there is no need for long-term supply contracts. Ordering commodities is placed as an administrative formality. The ability to choose high suppliers is then used to get a better deal with suppliers. Therefore, this scenario is characterized by buyer dominance.

b. Developing strategic partnerships: In some cases, one way of development is to create strategic partnerships with suppliers. In this scenario, a balanced power position is expected between buyers and suppliers. The development of close collaboration with suppliers will lead to improved product quality, delivery reliability, grace time, product development, product design, and will result in cost reduction as in the strategy of maintaining strategic partnerships (strategic quadrant).

4. **Non-critical Quadrant**
   a. Bulk Order Systems: Handling non-critical products requires a purchasing strategy that aims to reduce the complexity of logistics and administration. Contract systems are generally recommended as a way of doing business with routine product suppliers.
   b. Individual ordering, efficient processing: Whenever it is not possible to unite purchasing terms, professional buyers adopt a kind of individual order, for example by using a purchasing card. This strategy aims to reduce indirect purchasing costs associated with administrative activities, such as ordering and billing.

3. **Methodology**
   The conceptual framework for the study of purchasing strategies for small-sized contractors is to test the strategic level of the commodity based on questionnaires and contract documents, from the strategic level testing to obtain estimates of strategic commodities, then contracts are used to confirm strategic commodities [10]. After obtaining strategic commodities, then the strategy of purchasing commodities that are suitable are analysed by conducting literature studies so that the conceptual framework can be described as shown in the figure below.

**Figure 2. Conceptual Framework**

From the conceptual framework, the things that could be done are:

1. **Strategic Commodity Testing:** From this test, we will find out the current strategic level of commodity and also grouping the dominant commodity needs in building works.
2. **Strategic Commodity Purchasing Strategy:** From the Kraljic Matrix, which has been confirmed by contract documents, a good system strategy for commodities that will be better managed will be analyzed. The purchasing of these strategic commodities will have an impact on the value and risk of commodities in the future.
4. Analyzed Data and Results

4.1 Kraljic Matrix Strategic Commodities and Contract Documents

Strategic commodity assessments were obtained by conducting a survey of 10 small-sized contractors in Greater Bandung areas. The indicators on the questionnaire were made referring to the explanation of Irfanto et al. [10]. Based on the strategic commodity test questionnaire the Kraljic matrix results are obtained as shown below.

From the matrix results, it can be seen that the construction commodities tested turned out to be in the leverage and non-critical quadrants. In the leverage quadrant, there are commodities such as sand, cement, glass, reinforced steel, concrete, and brick, while timber commodities are in the non-critical quadrant. Since the value of the risk attribute is not too different, the determination of strategic commodities can be done by focusing on the value attribute. The axis value is as follows:

Table 1. The Value Attribute of Kraljic matrix

| Commodities         | Value Attribute |
|---------------------|-----------------|
| Sand                | 8.38            |
| Cement              | 8.2             |
| Windows             | 7.25            |
| Concrete            | 6.73            |
| Reinforcing Steel   | 6.5             |
| Brick               | 6.08            |
| Wood                | 5.2             |

Based on the results of attribute values in table 1, it can be seen that timber commodities are the lowest and are in the non-critical quadrant so that the commodities cannot be strategic commodities. It was compared with contract documents, namely recapitulation from Budget Planning (RAB), Bill of Quantity (BoQ), and Analysis of Work Unit Prices (AHSP) to support the statement. Based on the average recapitulation of the contract documents that have been studied, the results obtained are as shown in the table below.
Table 2. Percentage of Commodity Costs

| Commodities       | Percentage of Commodity Costs from Total Building Prices |
|-------------------|---------------------------------------------------------|
| Reinforcing Steel | 14.04%                                                  |
| Concrete          | 8.17%                                                   |
| Cement            | 6.77%                                                   |
| Brick             | 6.57%                                                   |
| Sand              | 4.42%                                                   |
| Windows           | 2.87%                                                   |
| Wood              | 0.94%                                                   |

The results from table 2 are not much different from the Kraljic matrix results. The wood commodities are in the last position and have the last ranking or the percentage of commodity values to the total value of the material is very low, thus it is concluded that commodities wood is not a strategic commodity. Based on the results of the Kraljic matrix and the recapitulation of commodity contract documents, the strategic commodities are reinforcing steel, cement, glass, sand, brick and concrete.

4.2 Strategies for Purchasing Strategic Commodities

Based on the results of the Kraljic matrix, it is found that at present the commodity is at the level of leverage. There are 2 choices of strategies for managing commodities that are in the leverage quadrant [9]:

1. Exploiting purchasing power: In this strategy, the company pursues competitive offers. Because of suppliers and products can be exchanged, there is no need for long-term supply contracts. Ordering commodities is placed as an administrative formality. The ability to choose high suppliers is then used to get a better deal with suppliers. Therefore, this scenario is characterized by the dominance of buyers.

2. Developing a strategic partnership: In some cases, one way of development is to create strategic partnerships with suppliers. In this scenario, it is expected to have a balanced power position between buyers and suppliers. The development of close collaboration with suppliers will lead to improved product quality, delivery reliability, a grace period, product development, product design, and it will result in cost reduction as in the strategy of maintaining strategic partnerships (strategic quadrant).

Based on the results of the Kraljic matrix, the risk attributes are at a low value, which means that availability in the market, supplier performance, and commodity flexibility is still good. One consideration in determining the purchasing strategy of each commodity is that cement, glass, brick and reinforcing steel commodities do not have significant price differences between suppliers because the commodity is a factory manufacturing commodity that has certain standards. The concrete commodities are commodities that can not be stored for a long time, thus it must be used immediately. The sand commodity is a commodity that does not have a fixed standard with diverse quality and diverse prices. Reinforcing steel commodities have a problem which is supply of commodities at certain times [11].
Table 3. Commodity Purchasing Strategy

| Commodities       | Special properties | Purchasing Strategy          | Detail                                                      |
|-------------------|--------------------|------------------------------|-------------------------------------------------------------|
| Cement Manufacture|                    | Exploiting Purchasing Power  | This type of commodity is always produced without waiting for orders |
| Sand Bulk         |                    | Develop a strategic partnership | To increase the efficiency of purchase value                      |
| Brick Manufacture |                    | Exploiting Purchasing Power  | This type of commodity is always produced without waiting for orders |
| Windows Manufacture| Just-In-Time       | Develop a strategic partnership | Commodities must directly used, and shipping based on orders |
| Concrete Manufacture|                | Exploiting Purchasing Power  | This type of commodity is always produced without waiting for orders |
| Reinforcing Steel  | Manufacture        | Develop a strategic partnership | Ensure availability of commodities when needed                  |

From the results of the considerations and purchasing strategies, cement, brick, and glass for buildings can be used as purchasing power exploitation strategies. This is because cement commodities are manufacturing commodities, thus it is always available. Sand commodities in buildings have varied prices without definite standards so that it is more possible to create strategic partnerships to increase the efficiency of the value of purchases in buildings. Concrete commodities in buildings have a high value, but concrete commodities are commodities that must be directly used when arriving in the field so that a suitable purchasing strategy is to create a strategic partnership. Rebar steel commodities in buildings have a value that is not too high so that to ensure that the commodity can be available is to make a strategic partnership.

5. Conclusion
The results obtained from this paper are strategic commodities according to small-sized contractors are cement, sand, concrete, reinforcing steel, brick, and glass with a strategy that is suitable for the current purchasing of each commodity for cement, glass, brick carried out exploiting purchasing power, while the commodities of sand, concrete, and reinforcing steel can be made to create strategic partnerships with suppliers to ensure availability and quality and improve the efficiency of time and costs of purchasing these commodities. This purchasing strategy is expected to help small-sized contractors in managing commodity purchases so that small-sized contractors can increase the efficiency of purchasing construction commodities.

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