

CONCEPTUAL BUSINESS MODELS OF STRATEGIC LOGISTIC SERVICES FOR SMALL-SIZED CONTRACTORS

MUHAMAD ABDUH

*Faculty of Civil and Environmental Engineering, Institut Teknologi Bandung, Bandung,
Indonesia*

The new Indonesian Construction Service Act has explicitly introduced the importance of supply chains for construction project delivery and sustainable supports of small-sized contractors to the Indonesian construction industry's efficiency. Most of the construction cost comes from the material cost to be delivered to the project site that needs proper logistic management. For large and medium-sized contractors, their capacities and projects values enable them to access closer tier of the supply chains; to the producers of strategic materials with more efficient transactions. This is not the case for small-sized contractors, therefore, there should be a strategic logistic service provided for helping them. This paper presents a development of a conceptual business model of a strategic logistic service, especially the third-party logistic service, for small-sized contractors in a small coverage area of operation. Seven business models were identified with the preliminarily identified potential to be the model for the region of Greater Bandung, Indonesia. The models were derived based on the origin entity that could transform or be created as a new business or extended business. The conceptual business models will be used for further research to develop proper and feasible business models of strategic logistic services for small-size contractors in the Greater Bandung area.

Keywords: Distribution, Material, Supply chain, Transportation, Warehouse.

1 INTRODUCTION

Indonesia is currently building its infrastructure intensively, and at the same time, a new Construction Services Act was launched in 2017 that attempts to correct the lack of previous legislation, so that infrastructure development in Indonesia would be supported by good quality construction services. Explicitly, the importance of construction supply chains to support the implementation of construction services with the fulfillment of domestic material, equipment adequacy, and the support of the state to the development of a small construction services business entity to support the construction services has been emphasized.

As in other countries, this construction supply chains will support contractors, especially in the supply of construction materials. Each commodity has its own supply chains with its own structure, behavior, and performance. One of the important things that determine the materials' shipping cost to the location of the construction project is how well the contractor can manage its supply chains, including the logistics system. For large and medium-sized contractors, the capacity and value of the projects they often work on allow them to gain further upstream access

of strategic commodities with economically valuable volumes, so that the supply chains they get will be short, the cost will be low, and it increases their competitiveness.

However, this does not occur to small-sized contractors because they do not get the same opportunity so that the material logistics costs become relatively more expensive per unit of each commodity. Hence, construction products from small contractors are relatively more expensive. It has an impact on the users of the construction product, namely the community; people would find it difficult to have good quality buildings at affordable prices.

In the logistics system, there are currently many strategic logistics services that try to provide logistics services more efficiently and effectively by offering shorter access from users to producers. Some of these services are like third-party logistics (3PL or TPL) and fourth party logistics (4PL), which have been developed in many countries with convincing success rates, especially for general commodities and manufacturing. The strategic logistics services system has also been developed in the construction industry, but it is usually carried out to support large contractors (Ekeskär and Rudberg 2015). However, more potentials are identified that the services would be directed to serve SMEs (Dybskaya and Vinogradov 2018).

2 SMALL-SIZED CONTRACTORS IN INDONESIA

The government's alignment with small-sized contractors cannot be separated from their roles in the implementation of construction services and in maintaining the stability and economic development of the country. Although the number of workers and the value of sales are small, their presence in the community is very significant in both to support the needs of the community in building procurement and as a cooperation partner in a supply chains managed by large and medium-sized contractors.

In Indonesia, based on 2013 data from the National Construction Services Development Board or LPJKN, there were 128,570 registered contractors; with 108,626 or 85% are small-sized contractors, 17,511 or 14% are medium-sized contractors, and large-sized contractors only 2,433 or 2%. The number of small-sized contractors, which is more than 80%, only absorbs less than 20% of construction works, while large and medium-sized contractors absorb most of the construction work in terms of value.

Thus, the level of small-sized contractors' competition is very high with relatively small construction value. If a small-sized contractor wants to grow, they must compete well in absorbing the construction market share of 20% and they need to try to take a large portion of the construction projects which carried out by large and medium-sized contractors, by becoming a subcontractor or partner of the contractor. The empowerment of small-sized contractors through the supply chain management mechanism owned by large and medium-sized contractors is believed to be able to increase the potential of developing small contractors themselves.

On the other hand, even the capacity of the small-sized contractor still depends on the supply chains that it makes or has because the value of the construction that has been done is relatively small in terms of quantity. The small-sized contractor does not get quantity benefits in the form of price discounts, a certainty of quantity, the certainty of delivery, and in negotiating the price of construction materials with members of the supply chains. Thus, the commodity prices obtained by small contractors per unit quantity are relatively more expensive compared to the prices set by large and medium contractors who have the advantage of the quantity of construction work. It is all because the access to producers is shorter; in the other words, the more parties involved in the supply chains, the more expensive the commodity will be (Abduh *et al.* 2012).

3 CONSTRUCTION SUPPLY CHAINS IN INDONESIA

In line with the understanding of supply chains in the context of manufacturing, the context of supply chains in construction are defined as a process of a set of activities to change raw materials to become the finished products e.g. roads, buildings, and planning services, which are used by service users without admitting the organizational boundaries. The supply chain in construction has different characteristics from the supply chain in manufacturing, such as the temporary nature of a construction project that produces a unique product with project team members who are constantly changing from one project to another, and by always moving locations. Regardless, all supply chains that are inherently in the market will be invited to come to the project site within a period, and it is the challenge. Thus, the supply chain management of construction projects is very important.

There are four roles of supply chain management (SCM) (Vrijhoef and Koskela 2000). The first role is related to clarifying the relationship between the supply chain and the location of the construction project. The information shared between supply chains and construction projects are very important. The second role of SCM is to load supplies from the supply chain smoothly so that it will be in accordance with the needs at the project site. The third role of SCM is to move as much activity as possible on the construction project site to the supply chain. This is closely related to product quality improvement, such as pre-fabrication of structural components. Lastly, the role of SCM is to incorporate the supply chain and construction project locations in real terms, and this means combining the three previous SCM roles. Roles 1 to 3, often known as the construction project logistics system, while the 4th role is the meaning of the SCM itself.

In Indonesia, studies on construction supply chains existed in the framework of the application of lean construction in Indonesia in 2005. In the early stage, studies were carried out to get a more complete form of the construction supply chains pattern. Furthermore, various initial studies were followed up with studies that led to efficient supply chain management methods. One of the main studies that have been done was the relationship between various parties involved in the implementation of construction, namely owners, contractors, sub-contractors, suppliers, and others. An efficient relationship has been studied based on the description of the relationships in construction projects, which in the end can be identified by various suitable methods in the construction supply chain management. However, the construction supply chains cost in Indonesia is not clear and has not been well developed and detailed enough. It happens because the companies do not feel like they need to break down the cost structure in detail, to control the supply-chain financing. In addition, the components of steel material purchase costs are significant, while transportation and inventory costs do not significantly affect the total cost (Abduh *et al.* 2012).

For construction industry level, the supply chain studies collaborate with the government to ensure the fulfillment and sustainability of strategic commodities, and the supply chain structure of large, medium and small contractors, and to create a solid construction business. For several national strategic commodities, such as reinforcing steel, steel profiles, and cement, their supply chain structures and the behavior of its supply chain members have been defined. Yet, the structure and channel of the supply chain of these strategic commodities can only be optimized by large contractors, while small and medium contractors must be empowered by larger contractors and the government with affirmative policy (Abduh and Pribadi 2014).

4 STRATEGIC LOGISTICS SERVICES FOR SMALL-SIZED CONTRACTORS

Nowadays, there has been a lot of development in manufacturing and general commodities. A strategic logistics service (SLS), such as third-party logistics (TPL or 3PL) or even fourth party

logistics (4PL) connects the needs of efficient logistics between the upstream and downstream of a supply chain (Aguezoul 2014). TPL is a logistics service that is held by third parties with the consideration that the company can focus on its core business. Usually, TPL covers warehouse services as well as transportation services. Furthermore, TPL would provide integration services with a supply chain management system (SCM), so that it is sometimes referred to the third-party supply chain management or 3PSCM and sometimes also called as a supply chain management service provider (SCMSP). The 4PL is a further development of 3PL, an integrator who provides a complete supply chain management service. There are many benefits that the TPL could offer and the competitive advantages for doing so, such as operating cost reduction, invested capital reduction, flexibility increase, customer service level improvement, and innovation capability improvement (Marchet *et al.* 2018).

It seems that the development in strategic logistics services (SLS) will continue to expand in line with the increasing globalization and business process efficiency (Saglietto 2013). Based on the first role in the Vrijhoef and Koskela (2000) model, the TPL can play a role as an unclear interface in the supply chain construction management (Ekeskär and Rudberg 2015). In some developed countries, the existence of strategic logistic service, especially TPL, has been applied in construction, but it is all to support large-sized contractors (Ekeskär *et al.* 2016). Whereas in fact, large and medium-sized contractors can manage their own supply chains, while small-sized contractors, even from the beginning, do not get the benefit from the existence of a construction supply chain. However, the potential of TPL to serve the SMEs (Dybskaya and Vinogradov 2018) has been identified.

Based on the previous study, small-sized contractors in Indonesia must be empowered by utilizing the existence of construction supply chains (Abduh and Pribadi 2014). There is a lack of access of small-sized contractors to available supply chains so that they cannot be compared to large and medium-sized contractors in the cement supply chain. Based on these considerations, it is necessary to see the possibility of developing a strategic logistics service system (SLS) to support small contractors, because they do not have good access to the construction supply chain to get their strategic commodities.

5 CONCEPTUAL MODELS

Based on the needs as previously explained, a general conceptual model of TPL for construction projects is shown in Figure 1. For that reason, to develop the TPL system for construction projects and specifically to support small-sized contractors in Indonesia, there must be a study of

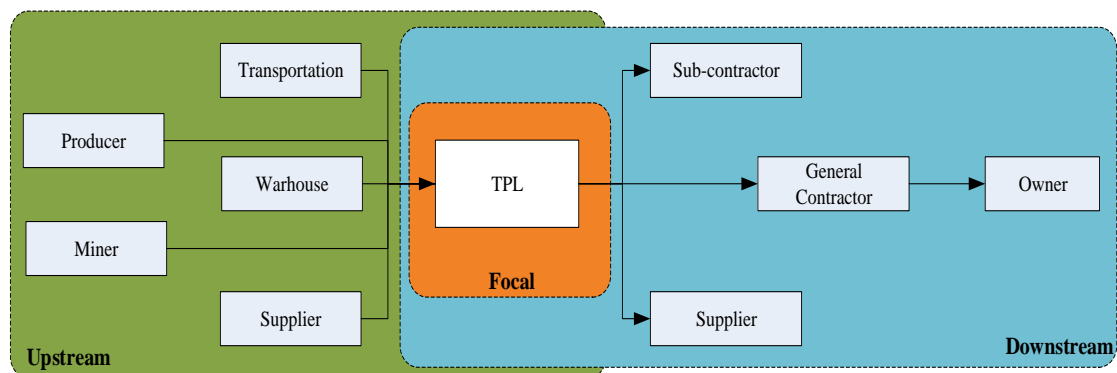


Figure 1. TPL conceptual model for construction projects.

the 3 domains in the construction supply chain with the TPL interface, i.e., the upstream, focal and downstream domains.

The study in the upstream domain is related to obtaining a complete figure of the structure and behavior of the supply chain construction's strategic commodities in a range of study areas, including the warehouse service market and transportation services, as a support. For the downstream, the need for construction in a range of study areas, as well as the capacity and the competition level of the small contractor must also be seen. While in the focal domains, the assessment of entity development, business modeling, and overall system integration must be carried out. The results of these studies will open opportunities for a new business model in the logistics field, such as strategic logistics services for small contractors. It can later be done in the form of community service by developing a start-up business.

For that purpose, a multi-year research to develop the TPL system for a small contractor in Greater Bandung area, covering Bandung city, Cimahi city, Bandung regency and West Bandung regency. In this area, there are 2,216 small-sized contractors, or constituted the majority (83.7%) of the contracting population in the Greater Bandung that were engaged in residential building as much as 25, 2%, in the field of civil engineering buildings 58.3%, and in the field of special buildings (other) 16.5%, with the value of construction in around IDR 66 trillion.

Based on the previous study on potential parties existed in Greater Bandung area, there are several possibilities how the TPL could be developed with focusing only to major commodities (Table 1) for small-sized contractors that are operating in residential and civil engineering buildings. In general, the business of TPL could be developed as a new business that is developed from scratch and as an extended business from an existing business that could be originated from upstream as well as downstream of the supply chain. A new business could be developed by the local government (public), a private company, or as a PPP project. In the downstream of the supply chain, the existing contractors, sub-contractors, or suppliers could extend their business to set up TPL service. While in the upstream, a transportation service provider, as well as warehouse service provider, could also extend their businesses to include other services as a TPL provider. However, every possible set-up could have advantages and disadvantages that will determine its potentials and feasibility to be TPL business models in the Greater Bandung area for small-sized contractors.

Table 1. Major commodities for small-sized contractors.

Residential Buildings	Civil Engineering Buildings
Brick	Aggregate
Aggregate	Clay
Timber	Stone
Cement	Cement
Glass	Rebar
Rebar	Asphalt
Precast concrete	Precast concrete

Based on the distinctive 3PL selection criteria identified in order to build a strategic outsourcing relationship (Marchet *et al.* 2018), the preliminarily identified potential of each business model of TPL based on the origin entity is shown in Table 2. The selection criteria used in the table are related to: geographical spread offered by the TPL (Geography); reputation, reliability, customer service level, customer satisfaction and contract fulfilment that TPL could achieve (Performance); information sharing and trust that TPL could commit (Trust); and the availability of appropriate physical facilities and equipment (Facility). The potential level of each

business model depends on the existing management capability, technology, competition, and networks of supply chains. Therefore, for each business model as depicted in Table 2, the management of TPL should include strategic planning, inventory management, transportation, capacity planning, and information technology (Gunasekaran and Ngai 2003).

Table 2. Potential business model of TPL for small-sized contractors.

Business Model		TPL Selection Criteria			
		Geography	Performance	Trust	Facility
New Business	Public	⊙	○	⊙	⊙
	Private	○	○	○	○
	PPP	●	○	●	●
Extended Business	Contractor/Sub-contractor	○	○	○	○
	Supplier	●	●	●	⊙
	Transportation Service	⊙	⊙	⊙	●
	Warehouse Service	●	⊙	⊙	●

Legend: ○: none; ●: small; ⊙: medium; ●: high.

6 CONCLUSION

This paper conveys the needs of strategic logistics service, especially the third party logistic (TPL), to empower small contractors in the Greater Bandung area, Indonesia. Moreover, seven business models were introduced to be further assessed their potentials and feasibilities to be the TPL models that suit for small-sized contractors in the area. It is expected that the results of the research can provide opportunities for Indonesian construction industries using the new business model and the supply chain management approach, specifically to empower small contractors.

References

- Abduh, M., and Pribadi, K.S., *Harmonizing the Indonesian Construction Resources Supply Chain*, in *The 20th Asia Construct Conference*, Hong Kong, 13-14 November 2014.
- Abduh, M., Soemardi, B. W., and Wirahadikusumah, R. D., Indonesian Construction Supply Chains Cost Structure and Factors: A Case Study Of Two Projects, *Journal of Civil Engineering and Management*, 18(2), 2012.
- Aguezoul, A., The Third-Party Logistics Selection: A Review Of The Literature, *Omega*, 69–78, 2014.
- Dybskaya, V. V. and Vinogradov, A. B., Promising Directions For The Logistics Service Providers Development On The Russian Market In Times Of Recession, *Transport and Telecommunication*, 19(2), 151–163, 2018.
- Ekeskär, A. and Rudberg, M., *Third-Party Logistics In Construction: Perspectives From Suppliers And Transport Providers*, 22nd Annual International Euroma Conference, 1–11, August 2015.
- Ekeskär, A., Rudberg, M., and Ekesk, A., Third-Party Logistics In Construction: The Case Of A Large Hospital Project, *Construction Management and Economics*, (34), 174–191, 2016.
- Gunasekaran, A. and Ngai, E. W. T., The Successful Management Of A Small Logistics Company, *International Journal of Physical Distribution and Logistics Management*, 33(9), 825–842, 2003.
- Marchet, G., Melacini, M., Perotti, S., and Sassi, C., Types Of Logistics Outsourcing And Related Impact On The 3PL Buying Process: Empirical Evidence, *International Journal Of Logistics Systems And Management*, 30(2), 139, 2018.
- Saglietto, L., Towards A Classification of Fourth Party Logistics (4PL), *Universal Journal of Industrial And Business Management*, 1(3), 104–116, 2013.
- Vrijhoef, R. and Koskela, L., The Four Roles of Supply Chain Management in Construction, *European Journal of Purchasing and Supply Management*, 6(3–4), 169–178, 2000.