TRANSACTION COSTS AS BARRIERS TO PREFABRICATED HOUSIING SUPPLY CHAIN IN CHINA

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Overview

Adopting prefabrication in housing field offers significant opportunities for reducing global energy consumption and greenhouse gas emissions (Zhang et al., 2011). Prefabricated housing (PH) achieves a reduction of 65% of construction waste, 16% of labour requirement on-site and 15% of construction time when compared with conventional housing construction (Jaillon and Poon, 2008). During its implementation, there are barriers, such as cost, lead-in time, and shortage of knowledge on prefabrication, etc, affect the progress of PH (Goodier and Gibb, 2005, Mao et al., 2013). Among them, cost is identified as the most critical obstacle (Pan and Sidwell, 2011).

The costs of PH are 7-10% higher than the conventional mode (POST, 2013). Previous studies only focus on the contruction costs. However, transaction costs (TCs) such as the costs of searching for projects, estimating, project partners, negotiation, monitoring, regulatory approval and dealing with any deviations from contract conditions, are often ignored (Li et al., 2015). There has been successful attempts to apply the TCs theory into the manufacture and construction management (Winch, 2001, Chang and Ive, 2000, Li et al., 2015, Sambasivan et al., 2017). Mitigating TCs can also be an alternative approach to improve the economic efficiency of PH. This paper aims to explore how TCs occure in the PH supply chain in order to reduce the frictions to PH. It helps understand key stakeholders' concern onTCs and will eventually contribute to the economic efficiency improvement of the PH supply chain.

Methods

This paper first, develops a TCs framework of PH supply chain based on TCs theory and the management of PH through literature study. A case study in China is followed to empirically understand how transaction costs occure in PH project in practice from key stakeholders' perspectives. There are 25 semi-structured interviews conducted with key stakeholoders (developer, general contractor, architecture designer, prefab components supplier and government) in two PH projects to understand the content and nature of TCs based on the provisional TCs list.

Results

The identification of TCs in the PH supply chain is based on five phases: concept, plan and design, manufacturing, construction, sale and operation phases. The result of semi-structured interview showed that the conceptual phase and the construction phase are identified as the stages where majority of TCs occurred. The developer and the general contractor are the roles that have more contractual relationships with others, and most of the TCs are therefore born by them (Qian, 2012, Kiss, 2016). In addition, it is also noticed that the transaction cost of permit and approval is throughout the whole supply chain of PH project because dealing with permits is a time-consuming and bureaucratic process in China. Results generated from the theoretical study and case study will be further extracted as strategic suggestion to the stakeholders to improve the economic efficiency of PH supply chain.

Conclusions

To improve the governance of the supply chain of PH and to make the implementation of PH project more financially attractive, TCs during the whole development process of PH must be better understood and ultimately reduced. This paper develops a framework to investigate the transactions costs throughout the PH supply chain. An empirical study verified and supplemented the TCs framework, which also provides an understanding of the occurrence of TCs along the PH supply chain from different stakeholders' perspective. Different stakeholders have their own understanding of TCs and they are bearing different TCs in different phases along the PH suppsly chain. Understanding TCs with different stakeholders' concern builds a basis to improve the economic efficiency of PH

project, and thereby it is hoped that more strategies for different stakeholders can be developed and executed correspondingly.

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