

Factors Affecting the Selection of the Procurement Methods for Construction Projects in Malaysia

Yap Zhi Shan¹, Kong Sio Kah², Benny Lee Hai Chim³

^{1,2,3}INTI International University, Faculty of Engineering and Quantity Surveying
Persiaran Perdana BBN, Putra Nilai, 71800 Nilai,
Negeri Sembilan, Malaysia

¹zhishann1229@hotmail.com, ²siokah.kong@newinti.edu.my, ³benny.lee@newinti.edu.my

Abstract

The selection of an appropriate procurement method is becoming an increasingly important issue due to complex decision-makings by clients early of project lifecycles. The aim of this research is to improve and enhance procurement system in Malaysia's construction industry through identifying, evaluating and ranking essential factors that affect the selection of the traditional and the non-traditional procurement methods from consultant quantity surveyors' perspectives. An extensive literature review of various procurement methods and factors which influence the selection of an appropriate procurement method for construction projects in Malaysia was conducted. A survey by questionnaire was carried out to elicit professionals' views on factors that influence the selection of procurement method for their planned projects; a total of 31 consultant quantity surveyors responded the survey. The data was then analysed using frequency analysis which then displayed in pie chart form and the factors were ranked according to their Relative Importance Index (RII). The results indicate that the top three significant factors that have most influence on the selection of procurement methods in Malaysia's construction projects are: price certainty; degree of project complexity; time constraints of project. This research concludes that there is lack of variety of procurement methods used in the Malaysia's construction industry where traditional procurement methods are preferred. This is because majority of professionals in Malaysia are not familiar and not widely experienced with the other alternative procurement methods. It is therefore highly recommended that the parties involved in the selection process should consider carefully all the available procurement methods for works which include study them and analyse their pros and cons to know their effects on the projects. Lastly, the project performance criteria must be established and match against the performance outcomes of the various methods before selecting.

Keywords

Factors of selection, Procurement methods, Construction

Introduction

Procurement comes from the word "procure" which literally means "to obtain by care or effort"; "to bring about" and "to acquire". Method is about a procedure, technique, or way of doing something, especially is accordance with a definite plan. In this context, project

procurement focuses mostly on the processes, procedures and organized methods that are required to obtain or acquire a construction project. Project procurement management is not a new idea and it was established long enough to ensure project success. For instance in the 1990's, Masterman (1996) narrated project procurement as structures put together or designed as a blueprint which can be used to design and execute construction projects for clients.

The decision to select the appropriate procurement method to implement a construction project is crucial. Though it does not necessarily lead to a successful project but with other factors taken into consideration can influence the success of the project (Okunola and Olugbenga, 2010). This is to confirm the theories in the 1990's such as Chan's (1996) ascertainment that the procurement method has a great influence on the time performance when it comes to construction projects. A project which is driven by the different types of procurement methods always has a massive effect on time. Besides, Naoum (1991) affirmed that the procurement method that were being used were having major effects on cost and time overruns. Bowen et al. (1999) was also of the view that the selection of procurement methods inappropriately was the major cause of construction industry's poor performance. This brings about the effect on project delivery when choosing a particular procurement method type for a project. The choice of the best method for procurement for a particular project to be adopted by the client has a great effect on the performance of the project.

However, the decision is not easy as there are many factors that affect the project procurement method decision. The selection criteria that are identified as the most common criteria influencing the choice of procurement method are time, complexity, quality level, price certainty, responsibility division, risk distribution and flexibility for changes and variations. It is important that clients and consultants understand these factors as it will assist them in making the right choice of procurement method for their projects (Sari and El Sayegh, 2007).

In the 1990's, a wrong procurement method often leads to project failure or client's dissatisfaction (Love et al., 1998). It often lead to time and cost overrun as well as compromised quality of works. The selection of procurement system therefore becomes a very important task for clients, as employing an inappropriate procurement system may leads to project failure (Chua et al., 1999).

Besides, it has been recognized that one of the principal reasons for the construction industry's poor performance is the inappropriateness of the procurement systems that have been chosen for the construction projects (Maizon, 1996). Some tend to have higher project costs exceeding the estimated cost; others end up not selecting the right contractor capable of completing the works which delays the works and cause the client not to achieve value for money as intended. Selecting an appropriate procurement system is a complex and daunting task for both the client and the client's advisers.

In recent years, a study conducted by Oladinrin (2013) stated that 60% of respondents were dissatisfied with the procurement system they had previously employed. Many clients have been selecting procurement systems in a cursory manner, and some clients even use a specific procurement system by default without making a deliberate choice. Inexperienced clients often have to rely on expert advice when selecting a procurement approach and this could result in inappropriate decisions with unforeseeable consequences. Experienced client may also suffer if they simply based their selection upon biased past experience and the conservative decisions of their in-house experts or consultants.

Moreover, selecting an appropriate procurement method in a particular project is normally based on the lowest initial project cost according to (Wong et al, 2001) and this normally brings about problems along the project's lifetime such as cost and time overrun. Researchers and Practitioners have then realized that considering the lowest initial price is not promising enough to be a criterion to select a procurement method in order to achieve the overall lowest project cost upon completion of the project (Wong et al., 2001). Therefore, it is very important to always consider all the factors that are important during procurement selection for a construction project that was why this study was conducted to investigate into those factors that influenced the selection of a particular procurement method for a project.

To sum up, inappropriate selection of procurement method for a construction project may result in client dissatisfactions, project failure, poor performance of project in term of quality of work and also cost overrun and late completion. The selection of an appropriate procurement system is one of the most important problem in the construction sector. The need for selecting and using an appropriate procurement system for a particular construction project, together with the proliferation of differing procurement systems, calls for more systematic methods of selection. To do this, decision criteria and factors pertinent to the selection of procurement approaches and their properties must be carefully identified, evaluated, and examined their effects on procurement method selection to overcome this problem.

The objectives of this research were to investigate the various types of procurement methods used in Malaysia construction industry and to identify the most significant factor affecting the selection of procurement methods in construction projects in Malaysia.

Methodology

The strategy used for this research paper was by conducting quantitative research approach for achieving primary data and through literature review for the secondary data. Primary data comes from online questionnaire survey that was sent out via email to 101 consultant QS practice in Selangor state that are registered under Board of Quantity Surveyors Malaysia (BQSM). Out of the 101 questionnaires that were sent out, only 31 questionnaires had been collected back, amounting to the response rate of 31%. Secondary data comes from various literature sources. The methods used for data analysis are Frequency Distribution and Relative Importance Indices (RII). Types of procurement methods are stated in Table 1.

Table 1. Types of procurement methods.

Traditional procurement method	Using this method, the client enters into an agreement with the design consultant to actually carry out the design work and prepare contract documents. Following the completion of this phase, the contractor is then appointed based upon the owner's criteria and the owner enters into a contract with the successful contractor for the assembly of the project elements. In essence, the client is under two contractual obligations; the design professional and the contractor. Larmour (2011) argues that this method is used to describe procurement which involve the client's design team producing a full construction design. The contractor will then tender for the construction of this package.
Design and build	Design and Build procurement (sometimes referred to as 'Design and Construct') can be described as using a single contractor to act as the sole

procurement method	point of responsibility to for the design, management and delivery of a construction project on time, within budget and in accordance with a pre-defined output specification using reasonable skill and care.
Management procurement method	Larmour (2011) pointed out that this method is used to describe procurement that involving a contractor to provide management services. Davis et al. (2008) pointed out that there are multiple forms of management procurement, including: management contracting and construction management. In the case of management contracting, the contractor has direct contractual links with all the works contractors and is responsible for all construction work. In Construction Management the client enters into separate contracts with the construction manager, designers and trade contractors. The contractor is paid a fee to professionally manage, develop a programme and coordinate the design and construction activities, and to facilitate collaboration to improve the project's constructability.

The factors affecting the selection of procurement methods were identified through previous research, which could be categorized into time, project complexity, quality, price certainty, responsibility division, risk distribution, flexibility for changes and variations.

Results and Discussion

The most common procurement method that selected by the respondents in construction projects in Malaysia is a traditional procurement method which represent around 96.8% from the total sample and the high percentage of this result reflects a bad indicator that there is no a variety of procurement methods selected and used in construction projects in Malaysia. Following next is the management procurement method (Packaged method) which represent only 3.2% from the total sample. It is important to point that alternative procurement methods are rarely selected in construction projects in Malaysia. The result of this study is in the agreement with Babatunde et al., (2010) study. Abu Bakar et al., (2009) mentioned that the traditional method was preferred by the organizations to procure the projects.

It is clear that more than a half (76.2%) and (52.4%) of the respondents would like to see design and build procurement method and management procurement method used more in Malaysia. Only 14.30% of the respondents would like to see a traditional procurement method used more in Malaysia. This result support that the respondents would like to deal with a non-traditional procurement method and apply a new procurement method rather than a traditional method in the future in construction projects in Malaysia.

Lastly, all the respondents have ascertained that the method adopted for a particular project has a great effect on the performance of a project in terms of cost, quality and time. The result revealed that Traditional method will benefit in Cost and Quality but at the expense of Time. The Design and Build method will benefit Cost and Time but at the expense of Quality. The Management Contracting method will benefit in Time and Quality but at the expense of Cost.

Table 2 represents the factors affecting the selection of procurement methods that has been ranked from most significant to least significant. The ranking was done by using Relative Importance Index (RII) method whereby factor with highest value of RII becomes the most significant factor.

Table 2: Ranking of Factors affecting the selection of procurement methods.

Factors	RII	Rank
(F1) Price certainty	0.815	1
(F3) Project Complexity level	0.751	2
(F2) Time	0.746	3
(F4) Risk distribution	0.585	4
(F5) Desired quality level	0.419	5
(F7) Flexibility for changes and variations	0.345	6
(F6) Responsibility division	0.332	7

The top 3 most significant factor that influence the selection process of procurement methods are Price certainty (RII = 0.815), Project complexity level (RII = 0.751), Time (RII = 0.746), followed by the next 4 factors which are Risk distribution (RII = 0.585), Quality level (RII = 0.419), Flexibility for changes and variations (RII = 0.345) and lastly Responsibility distribution (RII = 0.332).

Price certainty appeared to be the most significant factor if compared to all other factors in selection of different type of procurement methods. It leads to belief that most clients are concerned with the extent of finance they need to commit to the project so that they can plan their cash flow as early as possible. Project complexity level is ranked second significant factor. The result of Maizon et al., (2006) is also very close to this result as they ranked the project complexity factor in the third position in the Malaysian construction industry.

Then, time factor and risk distribution are ranked third and fourth significant factor respectively. This result is in line with Shiyamini et al., (2007) as time constrains factor affects strongly on the selection of procurement method. Mortledge et al., (2006) summarized that early completion because of time constrains is a critical sub-factor and a procurement method that supports speedy completion may be favored. In addition, Husam & Sedki (2009) are very close with this result as they ranked the risk avoidance factor in the fifth position in the Malaysian construction industry. Lastly, responsibility division was ranked the least significant, because clients usually consider the cost, time and risk first.

CONCLUSION

In a nutshell, the research can be concluded that Malaysian construction remains in the phase of almost exclusively using traditional methods. This may be presumably due to consultants are well familiar with traditional methods and this familiarity was found regarding to the long existence of the traditional procurement systems in the Malaysian construction industry. It could be noted that the percentages of the use of design and build and management procurement methods are still significantly low which indicates that either the clients and their representatives are still not well familiar with these variants of non-conventional procurement systems or are yet to appreciate their advantages. Furthermore, the result revealed that Traditional method will benefit in Cost and Quality but at the expense of Time. The Design and Build method will benefit Cost and Time but at the expense of Quality. The Management Contracting method will benefit in Time and Quality but at the expense of Cost.

In addition, price certainty is the major concern during process of procurement selection as it has a direct impact on resources. This is followed by degree of project complexity and time constraints of project. Therefore, it leads to the belief that most clients are concerned with the extent of finance they need to commit to the project so that they can plan their resources such as cash flow as early as possible. This finding is actually in line with the finding in the first objective as traditional method provides the highest level of price certainty among the three types of procurement method (as shown in the result of first objective, traditional procurement method is the most dominant method of construction works procurement in Malaysia).

References

- Abu Bakar, A., Osman, O., Bulba, A., 2009, *Procurement selection practices in post disaster project management: A case study in banda aceh, Indonesia*, Istanbul, Fifth International Conference on Construction in the 21st Century (CITC-V).
- Construction Industry Development Board (CIDB), 2007, 'Applying the procurement prescripts of the CIDB in Public Sector', *Construction Procurement Practice Guidelines 5th edition*, 25-32.
- Davis, P., Love, P., Baccarimi, D., 2008, *Building Procurement Methods*. Report, Project Affiliates Curtin, University of Technology, Western Australia Department of Housing & Work, Royal Melbourne Institute of Technology.
- El-Sayegh, S., 2007, *Significant factors affecting the selection of the appropriate project delivery method*, International Latin American and Caribbean for Engineering and Technology.
- Konchar, M., and Sanvido, V., 1998, *Comparison of U.S. project delivery systems*, Journal of Construction Engineering and Management, ASCE 124 (6), 435-444.
- Larmour, 2011, *A study of procurement routes and their use in the commercial sector*, PhD thesis, Interdisciplinary Design for the Built Environment.
- Love, P E D, Skitmore, M and Earl, G. 1998, *Selecting A Suitable Procurement Method For A Building Project*, Construction Management and Economic.
- Love, P., 2002, *Influence of project type and procurement method on rework costs in building construction projects*, Journal of Construction Engineering and Management, 18–29.

- Love, P., Davis, P., Edwards, D., and Baccarini, D., 2008, *Uncertainty avoidance: public sector clients and procurement selection*, The International Journal of Public Sector Management.
- Luu, D.T., Thomas, S., and Chen, S.E., 2003, *Parameters governing the selection of procurement system - An empirical survey*, Construction and Architectural Management, 209-218.
- Maizon, H. 1996, *The Effects of Procurement Systems on performance of construction projects in Malaysia*, South Africa, The University of Natal, Durban.
- Maizon, H., Li, M., Yin, Ng., Hooi, Ng., Heng, S., and Yong, T., 2006, *Factors influencing the selection of procurement systems by clients*, Faculty of Built Environment, University Technology Malaysia.
- Maizon, H. 1997, *Clients' Criteria on the Choice of Procurement Systems – A Malaysian Experience*, Proceedings of CIB W9: Procurement – A Key to Innovation. Montreal, 273-284.
- Masterman, J.W.E., 2002, *An Introduction to Building Procurement Systems*, 2nd ed, London, Spon Press.
- Mathonsi, M.D., and Thwala, W.D., 2012, *Factors influencing the selection of procurement systems in the South African construction industry*, African Journal of Business Management, 3583-3594.
- Ogunsanmi, O.E., and Bamisele, A., 1997, *Factors affecting the selection of project procurement methods*, Builder Magazine, 11-16.
- Peck, BV., 2006, *Construction Management: Choosing The Best Project Delivery Method*, online, date accessed 27th April 2019. Available from <http://www.cmaanet.org/>.
- Sari, A., and El-Sayegh, S., 2007, *Factors affecting the selection of the appropriate construction management at risk contractor*, Fifth LACCEI International Latin American and Caribbean Conference for Engineering and Technology (LACCEI'2007).
- Shiyamini, R., Rameezdeen, R., 2007, *Decision support system for the selection of best procurement system in construction*, Built-Environment-Sri Lanka - Issue 02, 43-53.
- Singh, S., 1990, *Selection Of Appropriate Project Delivery System For Construction Projects*, Sydney, Australia, Proceedings of CIB W90 International Symposium on Building Economics and Construction Management.
- Skitmore, R.M. and Marsden, D.E., 1988, *Which Procurement System? Towards A Universal Procurement Selection Technique*, Construction Management and Economics, Vol. 6 No. 3, 71-89
- Turner, A., 1990, *Building Procurement*, London, Macmillan Education Ltd.
- Yusof, A., Ismail, S., and Chin, L., 2011, *Procurement method as conflict and dispute reduction mechanism for construction industry in Malaysia*, Singapore, 2nd International Conference on Construction and Project Management.