

Consultant's Role in Minimizing The Occurance of Variation Order

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Abstract

The occurrence of variation order can be divided into four categories which are client-related variation order, consultant-related variation orders, contractor-related variation order, and other-related variation order. Most of the occurrence of variation order are related to the design, specifications, drawings and scope of works originated from the consultant. Therefore, this research aims to determine the consultant's role in minimizing the occurrence of the variation order. The questionnaires were distributed by hand or email to potential respondents around The Federal Territory of Kuala Lumpur and analysed using the descriptive analysis. In order to reduce the occurrence of variation orders, coordination between designers and owner in the design stage would help to spot the noncompliance to the owner's demand. Hence, another action of the consultant is to prepare complete contract document before tendering stage. Therefore, in order to develop effective strategies to reduce variation and improve project productivity performance, the findings will help consultants to focus on the root causes of variation during pre-contract or post contract stage.

Keywords: The Occurrence of Variation Order, Consultant's Role

Introduction

A variation is an alteration to the scope of works in a construction contract in the form of an addition, substitution, or omission from the original scope of works. Variations are predictable in any construction project (Mokhtar et al., 2000). Variation orders occur due to several reasons ranging from finance, design, aesthetic, geological factor, weather conditions to feasibility of construction, statutory changes, product improvement, and discrepancies between contract documents (Hanna et al., 2002; Ssegawa et al., 2002; Harbans, 2002; Uyun,

2007). Besides that, variation orders may arise from changes in the minds of agents involved in the contract.

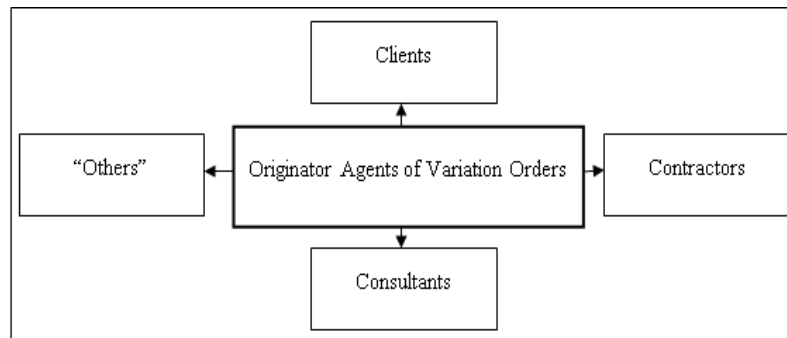


Figure 1. Originator Agents of Variation Orders (Source: Arain and Pheng, 2005)

The occurrence of variation orders was identified by many researchers and be categorized according to the originator agents (Thomas and Napolitan, 1995). These originator agents are clients, consultants, contractors, and unspecified “others” as presented in Figure 1 (Arain and Pheng, 2005). Based on the research done by the Mohammad et al. (2010), it was noted that client related changes are the most significant causes of the variation orders in the construction of building projects in the State of Selangor. However, according to Sunday (2010), it was discovered that projects handled by consultants are more prone to variation orders than projects handled by in-house professionals. It is supported by Oladapo (2007) that changes in specifications and scope, initiated mostly by project owners and their consultants, were the most prevalent sources of variation.

Arain and Pheng (2005); Wang (2000) stated that the client, the consultant, the contractor, or others can directly initiate variations, or the variations are required because one of the parties fails to fulfil certain requirements for carrying out the project. Table 1 shows the occurrence of variation orders from previous studies.

Table 1

The occurrence of the Variation Order

Category of variation	Occurrence of Variation	Identified Authors	Number of identified occurrence
Consultant related variations	Change in design by consultant; Errors and omissions in design; Conflicts between contract documents; Inadequate scope of work for contractor; Lack of coordination; Design complexity; Inadequate working drawing details; Inadequate shop drawing details; Lack of consultant's knowledge of available materials and equipment; Consultant's lack of required data; Ambiguous design details; Impediment in prompt decision making process; and Communication gaps occurring between the contractor and the designer.	Arain & Pheng (2005); Mohammad et al (2010); Sunday (2010); Wang (2000); Arain et al (2006)	13
Client related variations	Change of plans or scope by owner; Change of schedule by owner; Owner's financial problems; Inadequate project objectives; Replacement of materials or procedures; Change in specifications by owner.	Arain & Pheng (2005); Mohammad et al (2010); Sunday (2010); Wang (2000); Arain et al (2006).	6
Contractor related variations	Complex design and technology; Lack of strategic planning; Contractor's lack of required data; Lack of contractor's involvement in design; Lack of modern equipment;	Arain & Pheng (2005); Mohammad et al (2010); Sunday (2010); Wang (2000); Arain et al (2006)	11

Category of variation	Occurrence of Variation	Identified Authors	Number of identified occurrence
	Unfamiliarity with local conditions; Lack of a specialized construction manager; Shortage of skilled manpower; Contractor's financial difficulties; Differing site conditions; Defective workmanship.		
'Other' variations	Weather conditions; Safety considerations; Change in government regulations; Change in economic conditions; Socio-cultural factors.	Arain & Pheng (2005); Mohammad et al (2010); Sunday (2010); Wang (2000); Arain et al (2006)	5

Based on the Table 1, previous researchers had identified the occurrence of variation order originating from the consultants. Therefore, this research is conducted to determine the consultant's roles in minimizing the occurrence of the variation order.

Method

A questionnaire was developed and distributed to the consultants in The Federal Territory of Kuala Lumpur. The scope of the study is limited to the architects, engineers and quantity surveyors that have experience in handling small or huge projects. Thus, these questions covered the causes of variation order originating from consultants to minimize the occurrence of the variation order. The scope of study is focused on The Federal Territory of Kuala Lumpur. Thus, all information gathered from consultants who are interested to share their experiences dealing with variation order. As expected outcomes, this research will identify useful information regarding variation order among professionals in construction industry.

The target respondents are based on registered consultation companies from Board of Architects Malaysia, Board of Engineers Malaysia and Board of Quantity Surveyor Malaysia's websites which show that the total of consultation companies in The Federal Territory of Kuala Lumpur to be about 376 in population. By using stratified sampling calculation with the amount of 376 people, the ideal number of a population for the sample would be 71 people. Around 71 questionnaires were distributed to the architects, engineers and quantity surveyors (as Table 2) by hand and through email to every consultant company in The Federal Territory of Kuala Lumpur.

Table 2

The sample size of respondent from Architects, Engineer and Quantity Surveyors

Firms	Sub population (n)	Sample size
Architects	116	22
Engineers	128	24
Quantity Surveyors	132	25
Total	376	71

The research adopted five-point scale of 1-5 for ranking purposes. To facilitate the analysis the following numerical values were assigned to the respondents ranking: 'Strongly Agree' – 5, 'Agree' – 4, 'Moderate' - 3, 'Disagree' – 2, 'Strongly Disagree' – 1. Descriptive analysis was used to analyse the data obtained from all respondents. The variables are represented using the scale to make it easier for them to choose the answer.

Results and Discussion

There are thirteen (13) variables related to consultant related variations that are taken from the literature review of previous studies. Based on these variables, the questionnaire suggested the consultant's role in minimizing the occurrence of variations orders. Table 3 presents the mean and ranking of the consultant's role (Architect) in minimizing the occurrence of the variation order

Table 3

The consultant's role (Architect) in minimizing the occurrence of the variation order

	Mean	Ranking
Coordination between designers and owner in the design stage would help to spot the noncompliance of owner's demand	4.0000	1
Review and finalize the design during the design phase to control the errors and omissions in design	3.6000	2
To advise the client on technical, legal and financial matters	3.4667	3
Assist in clarifying the project objectives	3.4000	4
Understand the owner's scope of work thoroughly to avoid miscommunications between team members (Architects, Structural, Mechanical engineers, and Quantity surveyor)	3.2667	5

Based on Table 3, there are five (5) variables that are known as preferable variables that lead top rankings for the consultant's role (Architect) in minimizing the occurrence of the variation order "coordination between designers and owner in the design stage would help to spot the noncompliance of owner's demand" has the highest mean with 4.00. This is not a surprising result since most researchers have highlighted that these important roles will lead to strategising in minimizing the variation order. According to Arain and Pheng (2005) the continuous coordination and direct communication would not only eliminate design discrepancies and errors as well omissions in the design, but also provide an opportunity for professionals to review the contract documents thoroughly that would help in eliminating the variation orders arising because of conflicts in contract documents.

The lowest ranking with less preferable point to be the consultant's role (Engineer) understood the owner's scope of work thoroughly to avoid miscommunication between team members (Architects, Structural, Mechanical engineers, and Quantity surveyors) with the mean of 3.27. According to Acharya et al. (2006), the author suggested that consultants should aim at getting an understanding of the overall scope and goals of the project. This will then reduce the variation order in future.

Table 4

The consultant's role (Engineer) in minimizing the occurrence of the variation order

	Mean	Ranking
Coordination between designers and owner in the design stage would help to spot the noncompliance of owner's demand	4.0000	1
Review and finalize the design during the design phase to controls for the errors and omissions in design	3.9444	2
Assist in clarifying the project objectives	3.8947	3
To advise the client on technical, legal, and financial matters	3.8333	4
Understand the owner's scope of work thoroughly to avoid miscommunications between team members (Architects, Structural, Mechanical engineers, and Quantity surveyor)	3.4000	5

The most preferable variable for the consultant's role (Engineer) in affecting the occurrence of the variation order is "Coordination between designers and owner in the design stage would help to spot the noncompliance of owner's demand" with the mean of 4.00 (as Table 4). According to Arain and Pheng (2005), continuous coordination and direct communication would not only eliminate design discrepancies and errors as well omissions in the design, but also provide an opportunity for professionals to review the contract documents thoroughly that would help in eliminating the variation orders arising because of conflicts in contract documents.

The lowest ranking as less preferable to be the consultant's role (Engineer) is "Understands the owner's scope of work thoroughly to avoid miscommunications between team members (Architects, Structural, Mechanical engineers, and Quantity surveyors)" with the mean of 3.40. According to Acharya et al (2006), the author suggested that consultants should aim at understanding overall scope and goals of the project. Then it will avoid from misunderstanding and any variation works in future.

Table 5

The consultant's role (Quantity Surveyors) in minimizing the occurrence of the variation order

	Mean	Ranking
Prepare complete contract document before tendering stage	4.3913	1
Spend adequate time on documentation such as bills of quantities, specifications and preambles including critical revisions before tendering stage	4.3478	2
Understand the owner's scope of work thoroughly to avoid miscommunications between team members (Architects, Structural, Mechanical engineers and Quantity surveyor)	4.2609	3
To advise the client on technical, legal and financial matters	4.1739	4
Assist in clarifying the project objectives	4.0000	5

In Table 5, "Preparing complete contract document before tendering stage" has the highest mean with 4.39. It is to ease the contractor in pricing the rate in tender document and avoid any error in tender document. According to Yadeta (2014), a consultant produces a complete design as change of design was the major cause of variation. Therefore, before tendering stage, the design should be completed first before a quantity surveyor takes account into measurement of the building that is proposed.

The consultant should assist the client and contractor to avoid any error and misunderstanding during design phase until construction stage as shown in Table 5. According to Arain and Pheng (2005), the involvement of the consultants in the design phase would identify the noncompliance with their requirements at early stage. This may help in eliminating the occurrence of variation order arising from errors and design discrepancies during construction stage.

Conclusion

Based on the findings, the architect and engineer find that coordination between designers and owners in the design stage is the main approach to spot the noncompliance of owners' demand. Meanwhile, the quantity surveyors find that the contract document must be completed before tendering stage. The findings shows that consultants need to focus on the root causes of variation during pre-contract or post-contract stage to develop effective strategies to reduce variation and improve project productivity performance.

This research extends to explore in reducing the occurrence of variation orders on construction project based on consultant's roles. This research hopes contributes of filling the existing gaps in research on Variation Order in Construction Industry. This research is only able to focus on Architect, Engineer and Quantity Surveyor as consultant in Malaysia due to the lack of time, financial, knowledge, skills, and technical support. For future research, it is suggested that future researchers must be able to prepare themselves with various supports before conducting the final research.

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