THE SIGNIFICANT RISKS IN SMALL SCALE CONSTRUCTION PROJECTS

Nur Sharkila Binti Muhammad Shukri[1], Kong Sio Kah[2], Yong Yoong Kee[3]

[1-3]INTI International University

[1]nursharkila_88@yahoo.com

[2]siokah.kong@newinti.edu.my

[3]yoongkee.yong@newinti.edu.my

ABSTRACT Construction risks are the major consideration for planning and execution of construction projects. The risks management is crucial for project success. Every construction project is unique thus the risks exist are different from one another. Construction industry plays important role in economic growth of the country and the failure of which in dealing with the risks will slow down the growth of the economy. The industry is fragmented with numerous small scale projects thus it is imperative to identify the significant risks in small scale projects. This is to ensure effective management of the risks which is crucial for better economic growth. This study identifies the significant risks in small scale construction projects based on contractors' perspectives. The literature review reveals that there are various risks exist in the industry such as the risks due to human factor (clients, design team, contractors, sub-contractors and suppliers), physical aspects, economic factor, law and political issues as well as environmental concerns. Questionnaires were sent to thirty one (31) contractors and sub-contractors of small scale projects to collect views on the topic. The research findings discovered that the most significant risks are human factors. Such risks include delay in progress payments by the clients (Likert Scale Mean Score 4.9), insufficient information from designers (Likert Scale Mean Score 4.71), incompetent contractors (Likert Scale Mean Score 4.48), unsafe work practice by subcontractors (Likert Scale Mean Score 3.9) and poor building materials supplied by suppliers (Likert Scale Mean Score 3.77). The next significant risk is the physical aspect mainly shortage of building materials in the industry (Likert Scale Mean Score 3.74). It is followed by the risks of economy such as increase in taxation and import duty (Likert Scale Mean Score 3.68) followed by the risk due to law and political issue (Likert Scale Mean Score 3.68). The least significant risk stems from environmental issue such as ecological damage (Likert Scale Mean Score 1.77).

Keywords: Risk, Significant Risk, Uncertainty, Small Scale Construction Project.

1. INTRODUCTION

Despite the booming of industries, construction industry is largely exposed to unexpected risks that occur during pre and post contract. Such risks had caused major problems in the projects and even total failure to some cases. A total of 290 companies, contractors of various class especially for Class F contractors or G1 contractors were blacklisted for failing to complete various government projects such as the construction of buildings, provision of basic infrastructure, roads and bridges which involved in construction projects (JKR News and Updates, 2007).

Risks are due to the fact that one party is lack of knowledge in undertaking a task that had been given. Risk is a gap in knowledge that someone thinks there's a threat to a project. Risks can affect the cost, quality and time of a construction project. Uncertainty is something that cannot be estimated whereas risks are quantifiable. Risks and uncertainties were interrelated with problems. The level of knowledge of a person in term of risks of either being strong or weak would determine the effectiveness of risks management. The risks can be divided into two main groups, internal and external risks (El- Sayegh, 2008). Internal risks are mainly due to human factor such as risks from client, design team, contractors,

subcontractors and suppliers. External risks include risks of physical aspects, risk of economy, risks of law or politics and risks to environment. Breakdown of each risk is shown in Table 1 below.

Table 1: List of Internal and External Risk

Internal Risks	External Risks
1. Risk from Client	1. Risk of Physical Aspects
➤ Changes in the design from the client	➤ Natural disasters
➤ Difficulty obtaining the approval of important documents	➤ Erratic weather conditions
➤ Delay in progress payments to contractors	➤ Equipment and Machinery
➤ Poor communication between client, design team and contractors	➤ Supply of labour
➤ Bankrupt	➤ The situation of land
2. Risk of Design Team	➤ The lack of building materials
➤ Changes in the design / specification	➤ Accidents and injuries
➤ Inappropriate Estimating	2. The risk of the economy
➤ Not enough information	➤ High professional labour
➤ Scheduling the work program is not effective	➤ Tax and high import duty for imported goods
3. Risk of Contractors	➤ Inflation arising in the market
➤ The program is consistent with the construction timeline	➤ The volatility of prices of building materials
➤ Site management is weak	➤ Recession
➤ Technical knowledge and poor quality of work	3. Risk of aspects Law / Politics
➤ Lack of qualified staff	➤ Law enforcement by the government
➤ Cash flow problems faced by contractors	➤ Failure to comply with the contract
4. Risk of Subcontractors	➤ Difficulty getting local workers
➤ Poor work quality by subcontractors	➤ Strike worker construction site
➤ Delay in the completion of work	4. Risk to Environment
➤ Poor work coordination between subcontractors with main contractors	➤ Pollution
➤ Practicing unsafe work methods	➤ Ecological Damage
5. Risk of Suppliers	➤ Treatment of construction waste
➤ Building material supplied poor quality	
➤ Delay in delivery of materials to construction sites	

2. RESEARCH METHODOLOGY

The research method for this study was quantitative in nature. Specifically, the survey method was being adopted. Naoum (2007) expounded that there are three methods for research namely the survey, the case study and the problem-solving (action approach). The survey method generalizes result from the data obtained from a particular sample or population. It is further divided into descriptive survey and analytical survey. The specific survey adopted in this study was descriptive approach as the aim of this study was to discover the fact of a number of respondents with certain opinions suggested.

The data collection technique for the survey was postal questionnaires. The questionnaires were prepared based on the literature review. Questionnaires were sent to the individuals or the Project Managers of contractors with experience of handling small-scale projects. The targets of respondents were G1

contractors. The questionnaires consists of two parts namely Part A and Part B. Part A was regarding the background of the respondents. Among the information needed was the position of the respondent, the organization's name and the name of the project that had been handled by the respondents. Part B focused on the risks faced by the construction projects handled. It covers all aspects of both internal and external risks including human factors, physical aspects, economic issues, political issues and environmental risks.

The method used to analyse the questionnaire is Likert Scale score. Microsoft Excel and Microsoft Word were used to compile data to facilitate the data analysis by Likert Scale. The data obtained were presented in tabular form. Based on the data that have been analysed, conclusions on which risks are the most significant in small scale construction projects were drawn. Likert Scale method was used to analyse the questions in Part B on the questionnaires. There were five indicators of scale ranging from 1-5 which are indicated in Table 2 below.

Table 2 : Indicators of Scale

Range	Risk frequency indicators
5	Frequently
4	Occasionally
3	Rarely
2	Very Rarely
1	Never

Data obtained from the questions in Part B were analysed using mean score . Mean scores can be calculated using the formula shown below:

$$\bar{\chi} = \frac{\Sigma \chi i}{n}$$

Where as
$\bar{\chi}$ = Mean Value
$\Sigma \chi i$ = Frequency X Scale
n = Total Respondent

Table 3: Example for the mean score for Internal Risk (Risk Level) by the Client

Description	Frequency					Total Score	Total Respondent	Mean Score
	1	2	3	4	5			
Risk From Clients: Changes in the design by the client (Changes in client requests during the construction phase)	0	0	4	6	5	61	15	4.06

Table 3 above is the example of calculation of the Likert Scale Mean Score (LSMS) for risk of change in design by clients. Four respondents chose simple Critical, 6 people chose critical and 5 people chose most critical . For frequencies of 1 and 2 is 0. Therefore, the mean value is:

$$= \frac{(0 \times 1) + (0 \times 2) + (4 \times 3) + (6 \times 4) + (5 \times 5)}{15}$$

= 61
= 61/15
= 4.06

Next, to analyse and determine the mean score range will be calculated as follows. The mean range would be divided into three categories which is not significant, moderate significant and most most significant as shown in Table 4 below.

Table 4 : Level of Risk According To Likert Scale Mean Score

Level of Risk	LSMS
Not significant	1.00 – 2.33
Moderate Significant	2.34 – 3.66
Most Significant	3.67 – 5.00

From the example in Table 3, the mean value is 4.06. As such, we can conclude that the level of risk on the part of the client on the changes in design is a most significant risk as it falls between the range of LSMS 3.67 and 5.00 according to Table 4 above.

3. FINDINGS AND DISCUSSION

Internal risks are more significant as compared with external risks based on the survey results shown in Table 5 below. Delay in progress payments to contractors by the client is the most significant risk faced by the contractors in small scale projects with 4.90 in Likert Scale Mean Score (LSMS). The claims of payment that had been submitted to the clients are delayed for weeks or months and affected the progress of the projects and contractors' financial strengths according to the feedbacks from the respondents.

The second highest risk is insufficient information from designers. The information of designs or any types of the information of the projects is prepared by the design team and provided to the contractors. Timely provision of such information is crucial for smooth running of the projects. But unfortunately, insufficient information is revealed to be the second most significant risk with LSMS 4.71. Among the examples given by the respondents is insufficient soil test report and site investigation information given to the contractors.

The next significant risk faced by contractors of small scale projects is incompetency of workers with 4.48 in LSMS. This is followed by unsafe work practice by subcontractors which is 3.90 in LSMS. This is followed by the risk related to delays in the supplying building materials and poor quality of materials with 3.77 in LSMS. The risk associated with incompetent workers resulted in poor workmanship. Unsafe work practice by subcontractors resulted in higher insurance premiums and claims. Poor quality of materials resulted in more reworks.

On the other hand, external risks appear to be less significant as compared with internal risks in Table 5 below. The LSMS for Risk of lack of building materials (physical aspect) in construction market which is related to suppliers is 3.74. While for the economic aspect, the risk of tax and import duty charges in a project during the progress is the next significant risk with LSMS 3.68. The risk of paying the high charges of tax and import duty causes costs increase during construction. The LSMS obtained for the risk of long period of time taken for getting the work permit or licence for foreign workers is 3.68. Due to the long period of time, this may cause shortage in supplying labor to the contractors and causes delay in a project. The risk related to environmental issue is considered insignificant with LSMS merely 1.77.

Table 5: Significant Risksin Small Scale Construction Projects

No.	Source of Risk	Sub-category of Risk	LSMS
	Internal Risks		
1	Clients	Delay in progress payments to contractors	4.90
2	Design Team	Insufficient information	4.71

3	Contractor	Incompetency of workers	4.48
4	Subcontractor	Unsafe work practice	3.90
5	Suppliers	Poor quality of building materials	3.77
	External Risks		
6	Physical Aspect	Lack of building materials	3.74
7	Economics	Tax or import duty revision	3.68
8	Law/Politic	Delay in getting work permit for foreign workers	3.68
9	Environment	Ecological damage	1.77

4. CONCLUSION

The findings of the current study clearly show that the risks faced by contractors of small scale construction projects are mainly human factors (internal risks). Clients contributed the most to the high significance level. Delayed payments posed major risks to small scale contractors which weakened their financial strength and performance. Insufficient information from designers is the next significant risk followed by unsafe work practice by subcontractors and poor quality of building materials by suppliers.

Other risks (external risks) are moderately significant as compared with the internal risks. Lack of building materials in the construction market, Revised tax or import duty, delay in getting work permits for foreign workers and ecological damage are less significant compared with human factors. As such, contractors of small scale projects are advised to pay more attention to human factors risks management.

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