An Investigation on the Preference of Risks Responses in Malaysia

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Abstract

An effective risk management system is significant in providing a better decision making framework to achieve project or organisational objectives. Risks cannot be avoided in such dynamic construction sector, irrespective of construction project size. An appropriate treatment plan should be adopted to counter different types of risks. The selection of risk response should consider the magnitude of the risk significance and its impacts on the project objectives. The objectives of this paper are to identify risk responses taken by local construction players in facing with the risks and also to study the underlying reasons for the preference of risk retention in treatment of financial risk. A combination of questionnaire survey and interview was applied to investigate the selection of treatment plans in dealing with risks. Different risk treatment plans were selected to deal with the different risks in accordance to the risk nature and characteristic themselves. The questionnaire survey result shows that risk retention is the preferred strategy when responding to financial risk while risk control is chosen to react with time risk. A follow-up clarification by interview survey was carried out to further investigate respondents' responses. This study could help in expanding the risk management knowledge in the Malaysian construction industry by increasing one's understanding towards the suitability of risk responses employed for different kinds of risks.

1.0 Introduction

In the early stage of a construction project, there is a high likelihood of risks associated with the cost, time and quality will occur due to the lack of information. Risks cannot be avoided in such dynamic construction sector, irrespective of project size. There are several factors that influence the risks level including the project size, complexity, location, time available for design and construction, familiarity with the project, personnel bias, market condition, fraudulent practice, level of competition, construction, economic and political changes (Flanagan and Norman, 1993; PMI, 2004; Smith *et al.*, 2006).

The better way to handle the inevitable risks before they eventually have a "snow ball" effect is to manage them well from the appraisal phase of a project. Risk management is an integral part of project management (Ward, 1999). An effective risk management system is significant in providing a better decision making framework to achieve project or organisational objectives (Loosemore *et al.,* 2006).

Zou *et al.* (2007) have indicated that risks are prioritised according to their significance of influence on typical project objectives in terms of cost, time, quality, safety and environment sustainability, and then scrutinised from a joint perspective of project stakeholder and life cycle.

The purpose of this paper is to present the result of the study that identifies the risk responses employed by local construction players in facing with the risks and the underlying reasons for the preference of risk retention in treatment of financial risk.

2.0 Problem Statement

Poor or non-conformance of specification requirements and delay of construction projects are still considered high in the local construction industry. In year 2005, about 17.3% of 417 government contract projects in Malaysia were considered sick (more than 3 months of delay or abandoned) (Sambasivan and Yau, 2006). Public Accounts Committee (PAC) chairman, Datuk Shahrir Abdul Samad has revealed that in year 2007, the repair works on the defective flyover of Middle Ring Road 2 (MRR2) in Kepong cost RM 70 million out of the total project cost of RM120 million (Bernama, 2007).

Although risks are inevitable in construction industry, RM has not widely been adopted into the Malaysian construction industry. Local construction players still take no precaution on risks and only address them when they had became crisis. Nonetheless, risk management has been practised in the Malaysian insurance and banking, information technology and services industry such as HSBC Bank, Bank Negara, ING insurance, Bursa Malaysia, Telekom Malaysia, IBM and etc. An awareness and concern on risk management knowledge should be raised among the construction players to improve the project performance and achieve the stakeholders' expectations.

3.0 What is Risk?

Loosemore *et al.* (2006, p. 10) have defined risk as "a potential future event which is uncertain in likelihood and consequence and if occurs, could affect a company's ability to achieve its project objectives." Risk is always expressed in terms of probability or the frequency of occurrence of a defined event and the magnitude of the consequence on loss or gain (He, 1995). Nonetheless, risk does not necessarily mean the possibility of bad outcomes and negative consequences; it can refer to a chance of positive events too (Loosemore *et al.,* 2006).

Risk = probability or frequency x consequence

According to Capper (1995), Risk Management (RM) is a technique used to minimise and manage the risks in the most efficient and appropriate way. A study of Wang *et al.* (2004, cited in Perry and Haynes, 1985) has stated that RM allows for the establishment of appropriate organised framework to assist project stakeholders or decision makers to manage them efficiently and effectively. RM does not kill off the project commencement or dampen the project profitability (Amos and Dent, 1997) but reduces the probability of occurrence and impacts induced by the risks (Smith *et al.*, 2006).

Risk management framework entails risk planning, risk identification, risk analysis, risk response and risk monitoring and control (PMI, 2004). There are substantive studies emphasising on the risk identification and risk analysis processes rather than risk response even though risk response is a significant step in RM framework too. A planning will not be realised if the planning does not performed. Thus, this paper examines the risk response stage of the RM framework.

4.0 Risk Response

Risk response is the process identifies, evaluates, selects and implements or adopts one or more strategies devised to mitigate the risks or reduce the consequences to an acceptable level (Morledge *et al.*, 2006 and Kerzner, 2003). PMI (2004) has assured that risk response includes addressing the risk priority, identifying the responsible party, establishing resources and activities into plan and providing an estimate of cost and schedule associated with the risk response used.

An organisation's risk attitude and exposure guides this decision or it could be that the cost/benefit result of any action is actually negative (Wyk *et al.*, 2007). Planning of risk response procedures is an important part of

ensuring that there will be no negative impact on the project outcome. The risk response planning depends mostly on the project managers' ability to foresee potential dangers, which in turn, depends on the ability of the person to utilize previously learned knowledge and experience in dealing with uncertain situations (Perminova *et al*., 2007).

The objectives of a risk response plan include assigning responsibility and bestowing authority on the project risk management process and also helping in setting expectations for results (Teneyuca, 2001). There are six options of risk response comprising of risk retention, risk reducing, risk sharing, risk transfer, risk control and risk avoidance. The selection of a proper risk response depends on the risk priority and the available resources. Different risk responses are selected in consistence with their relative to the severity of risk consequences as shown in Figure 1.

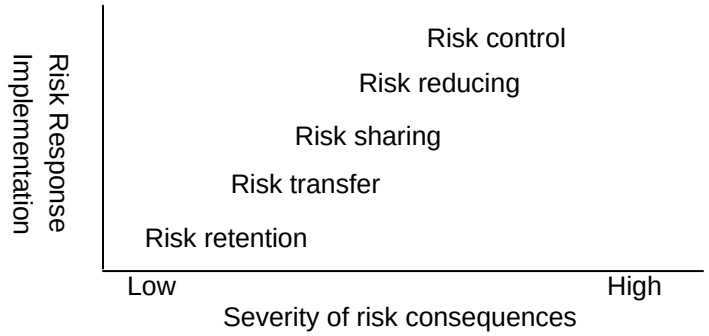

Figure 1 Risk response implementation strategies with relative to the severity of risk consequences (adapted from Kerzner, 2003, p.686)

Risk retention is an acknowledgement of the existence of a particular risk situation and a conscious decision to accept the associated level of risk, without engaging in any special efforts to control it (Kerzner, 2003). This is quite important especially to acknowledge one's ability to treat all the risks. Risks associated with small and repetitive losses can be best controlled by retaining them (Salman, 2005). For example, the residual risk from technical risk could be retained as the remaining impact is acceptable. However, frequent adoption of risk retention especially the passive one could lead to a failure since no practical measures has been taken to deal with the risk.

Risk transfer is the shifting and reallocation of risk along with ownership of one party to another third party, without changing the total amount of risk and reducing the criticality of risk sources (Smith *et al.*, 2006 and PMI, 2004). Externalising the risk down the supply chain by sub-contracting (Winch, 2000) or subletting to whom that would be in the better position to assume and handle the risk. Generally risk transfer is more applicable especially for financial risk exposure. However, if the risk taker does not know well of the consequences of his actions, the results may be a failure.

Risk sharing is principally achieved through the contractual mechanism to develop the sense of collective responsibility among the project stakeholders (Loosemore *et al.*, 2006). Risk sharing can be made explicitly or implied provisions in the contract clauses. For instance, joint venture shares the financial risk and technical risk among the parties involved by reducing the exposure of each party towards the risks.

Risk reducing or risk mitigation is an approach used to minimise the probability and impacts of risks to an acceptable threshold. Consideration of alternative solutions in kind of contract strategies, design, material, technique and technology is included as one of the strategy (Loosemore *et al.*, 2006). Flanagan and Norman (1993) have revealed that physical protection can be taken to decrease the possibility of potential losses and

also protect people and property such as an independent quality assurance team. Utilisation of advanced technology such as industrialised building system can decrease the exposure of the workers to risks.

Kerzner (2003) has stated that risk control does not attempt to remove the source of the risk but seeks to reduce the risk. Reviews, walk-throughs and inspections are used to reduce both the chance and possible impacts of risks through timely assessment of actual or planned events (Kerzner, 2003). A tracing system can be used to monitor the development and alteration of risk nature and thus to discover the early sign of risk evolution and prevent it from getting worse.

Risk avoidance is a refusal to accept the risks or action taken to ensure that risks would not happen. The cause and source of risk would be eliminated and an alternative solution is considered. Flanagan and Norman (1993) have addressed that risk avoidance typically is associated with pre-contract negotiation stage but sometimes it may extend to decision making in the project implementation phase. Wong and Hui (2006) have stated that it is possible for the contractor to prepare and maintain an alternative work plan to avoid risks, such as seasonal weather extremes. However, an unwise or blind avoidance to risk could result in losing the opportunities to earn profits as well since the risk is always associated with gain.

5.0 Research Methodology

Questionnaire surveys do not involve direct observation but seek to obtain a composite profile of the large population (Cooper and Schindler, 2003). This method is chosen for the study because it is useful especially to assess the attitudes and opinions on a variety of subjects of risks in Malaysian construction industry. A total of 600 sets of questionnaires were sent out to the target respondents comprising of developers (20%), contractors (60%), architects (10%) and engineers (10%).

Interviews can be used as a follow-up procedure to questionnaire survey to further investigate respondents' responses (McNamara, 1997). A semi-structured interview, the second method is used as a means of data collection because it provides a degree of freedom and adaptability. The standardised questions have also defined the explored area (McNamara, 1997). The interviewees were 1 architect, 1 civil and structural engineer, 2 contractor G3, 1 contractor G7, 2 government bodies, and 1 developer.

6.0 Findings

6.1 Findings of Questionnaire Survey

Generally there are 6 risk responses that could be taken in dealing with the risks namely: risk retention, risk reducing, risk sharing, risk control, risk avoidance and risk transfer. The six categories of risk factors are used based on the major risk factors found in literature review and modified to suit to the Malaysian context. The risk factors categories are financial risk, time risk, personnel risk, design and technical risk, contractual risk and safety accident risk. A five-point Likert scale is used to measure the frequency of the use of risk responses in managing the risks, as in the studies of Kwok *et al.* (2000), Rao and Mak (2001), Lyons and Skitmore (2002). A weight of 1, 2, 3, 4 and 5 are assigned to each point along the scale to represent never, seldom, sometimes, frequent and very frequent correspondingly.

Risk retention is the response preferred by most of the respondents in managing *financial risk* with a weightage of 127 and a mean of 3.53. Risk control is the second choice in managing financial risk as it obtained 112 in weightage and 3.20 in mean. The following responses according to their mean is risk reducing (3.14), risk sharing (3.03), risk transfer (2.97) and risk avoidance (2.88). Table 1 illustrates the preference of risk responses in dealing with financial risk.

Table 1 The preference of risk responses for financial risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev.	Rank
Risk retention	3	3	12	8	10	127	3.528	1.237	1
Risk reducing	4	6	10	9	5	107	3.147	1.234	3
Risk sharing	3	9	11	6	5	103	3.029	1.193	4
Risk control	4	8	9	5	9	112	3.200	1.368	2
Risk avoidance	5	12	3	8	5	95	2.879	1.364	6
Risk transfer	6	4	11	7	4	95	2.969	1.282	5

Most of the construction players chose risk control as the risk strategy in dealing with *time risk* with the highest weightage (118) and mean (3.28). The next approach selected in handling time risk is risk reducing and it obtained weightage of 102 and a mean of 3.00. The order of risk response selected according to their frequency is risk avoidance (2.90), risk retention (2.58), risk transfer (2.42) and risk sharing (2.33). The findings of the choice of risk treatment when facing with time risk are shown in Table 2.

Table 2 The selection of risk responses in dealing with time risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev	Rank
Risk retention	6	11	8	7	1	85	2.576	1.106	4
Risk reducing	3	10	9	8	4	102	3.000	1.181	2
Risk sharing	10	9	9	3	2	77	2.333	1.190	6
Risk control	3	8	7	12	6	118	3.278	1.215	1
Risk avoidance	6	8	6	7	5	93	2.906	1.366	3
Risk transfer	7	14	6	3	3	80	2.424	1.200	5

According to the respondents, risk control is the most favourite approach that will be employed to manage *personnel risk* since it has the highest weighting (100) and mean (2.85). Risk reducing is the second option in reacting to personnel risk and it gained 90 in weighting and 2.73 in mean. The subsequent actions chosen in handling personnel risk in proportion to their mean are risk sharing (2.60), risk avoidance (2.51), risk retention (2.36) and risk transfer (2.29). Table 3 shows that the selection of treatment plans of local players in managing personnel risk.

Table 3 The selection of risk responses for personnel risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev.	Rank
Risk retention	11	9	6	4	3	78	2.364	1.300	5
Risk reducing	5	11	8	6	3	90	2.727	1.206	2
Risk sharing	6	13	7	7	2	91	2.600	1.190	3
Risk control	6	7	12	6	4	100	2.857	1.240	1
Risk avoidance	11	7	7	8	2	88	2.514	1.367	4
Risk transfer	9	14	5	4	2	78	2.294	1.203	6

Local construction players opt to use risk reducing (weightage of 112 and mean of 3.29) in responding to *design and technical risk*. The second preferred option is risk control and it obtained 107 in weightage and 3.15 in mean. Risk sharing with a weightage of 102 and mean of 2.81 become the third preferred strategy in dealing with design and technical risk. The sequence of following risk response according to their mean is risk avoidance (2.78), risk retention (2.47) and risk transfer (2.43). The results of the risk responses chosen for design and technical risk are shown in Table 4.

Table 4 The preference of risk responses in managing design and technical risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev.	Rank
Risk retention	8	8	9	7		79	2.469	1.107	5
Risk reducing	4	4	9	12	5	112	3.294	1.219	1
Risk sharing	7	11	8	6	5	102	2.811	1.371	3
Risk control	5	7	7	8	7	107	3.147	1.374	2
Risk avoidance	6	6	12	5	3	89	2.781	1.218	4
Risk transfer	6	13	7	5	1	78	2.438	1.073	6

In managing *contractual risk*, risk retention is the most preferred option and it has the highest weighting (108) and mean (3.27). Risk control (3.19) is more desired than risk reducing (3.09) by comparing their mean although both of them have the same weighting (102). Risk sharing scored a weighting of 101 and mean of 2.97. The subsequent risk responses in dealing with contractual risk are risk transfer (2.53) and risk avoidance (2.93). Table 5 demonstrates the frequency of risk response used for contractual risk.

Table 5 The preference of risk responses in managing contractual risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev.	Rank
Risk retention	3	8	7	7	8	108	3.273	1.329	1
Risk reducing	3	7	11	8	4	102	3.091	1.156	3
Risk sharing	4	8	10	9	3	101	2.971	1.167	4
Risk control	2	7	10	9	4	102	3.188	1.120	2
Risk avoidance	7	9	7	5	2	76	2.533	1.224	6
Risk transfer	5	8	5	8	4	88	2.933	1.337	5

As shown in Table 6, most construction players prefer risk transfer (weightage of 117 and mean of 3.25) to manage *safety accident risk*. Risk avoidance with weightage of 100 and mean of 2.86 is the second option chosen in handling safety accident risk. The preference of risk response for safety accident risk following their scored mean is risk reducing (2.85), risk retention (2.85), risk sharing (2.67) and risk transfer (2.39).

Table 6 The selection of risk treatment plan for safety accident risk

Risk response	1	2	3	4	5	Weightage	Mean	Stand. Dev.	Rank
Risk retention	7	8	5	9	4	94	2.848	1.372	4
Risk reducing	6	8	9	7	4	97	2.853	1.282	3
Risk sharing	8	8	8	5	4	88	2.667	1.339	5
Risk control	5	6	6	13	6	117	3.250	1.317	1
Risk avoidance	9	5	9	6	6	100	2.857	1.438	2
Risk transfer	11	9	6	3	4	79	2.394	1.368	6

6.2 Interview Findings

Interviews are carried out to clarify any doubt and uncertainty of the feedback of questionnaire survey. There are two questions that enquire on the preference of risk retention for financial risk management and the common methods used to manage time risk.

Each party has its different standpoints for the preference of risk retention in managing financial risk. The interviewees perceived that the selection of risk retention by the local construction players mostly owning to the availability of other alternatives for financial risk management. The interviewees have viewed that risk retention is preferred for financial risk may arise from several reasons. Among them are inherent conservative attitudes

of local construction players, the lack of knowledge and awareness of RM, and the nature of financial risk which is beyond one's control.

Seven out of eight interviewees have held the view that the time risk can be controlled through the application of other resources such as money, manpower and advance construction technology or equipments. A compromise between time and cost is needed to achieve the best result of the project performance. A good milestone planning and resources arrangement can monitor the time risk by tracking the planned work programme throughout the project life cycle. Gantt chart and checklist are useful tools in controlling the occurrence of time risk.

7.0 Research Limitations

The sampling of questionnaire is limited in construction players in Peninsular Malaysia which excludes Sabah and Sarawak. The response rate of questionnaire survey is unfavourable which reached only 7.50%. This has affected the reliability of the collected data to draw a conclusion that generalise the perception and attitude of local construction players.

8.0 Discussions

Previous researches (Akinyote and MacLeod, 1994; Baker *et al.,* 1999; Amos and Dent, 1997; Uher and Toakley, 1999; Lyons and Skitmore, 2002) have emphasised on the risk responses employed by the construction industry without further differentiating them in treating a particular risk factor.

In the Australian construction industry, Uher and Toakley (1999) have found that risk transfer is generally preferred to risk control particularly by the general contractors and consultants. There is also a high preference of risk avoidance or reduction than risk retention by the designers in the Australian construction industry. Nonetheless, Lyons and Skitmore (2002) have revealed that risk reduction is the most frequently used risk response method followed by risk transfer, risk elimination and risk retention in Australian construction industry in year 2002.

According to Akinyote and MacLeod (1994), firms in the United Kingdom (UK) construction industry tends to treat risk differently and the risk response in ranking order of most often to least often used are risk transfer, risk retention, risk avoidance and risk reducing. However, the trend has been changed as Baker *et al.* (1999) have revealed that risk reduction is the most favoured technique followed by risk transfer, risk retention and risk elimination in the construction industry of the United Kingdom in year 1995. On the other hand, the study of Amos and Dent (1997) have also showed that risk retention is most frequent used, followed by risk reduction, risk remove, risk transfer and risk avoidance in UK construction industry.

Based on the current study findings, risk retention is the preferred method to manage *financial risk* and *contractual risk* in the construction industry. The other technique to manage risk, that is risk control is mostly employed to manage *time risk* and *personnel risk*. Risk reduction is used as the strategy for dealing with *design and technical risk* while risk transfer is preferred in managing *safety accident risk*.

Results from the interview survey have further reinforced the selection of risk retention as the most frequent method used by local builders in handling *financial risk*. The interviewees have held the view that financial risk mostly arises from factors beyond people control such as global rising of building material price. It is onerous to avoid it. There is no choice left for the builders except from accepting the outcomes. The attitude of "wait and see" leads to the preference of risk retention for financial risk management compared to other available options.

Nevertheless the risk retention should not be selected particularly risk associated with catastrophic impacts since the builders need to absorb all the risk impacts. Despite financial risk is uncontrollable, local construction players should also take the risk into account to have alert on it and subsequently take mitigation plans such as included fluctuation price in the tender rate. Therefore, it is necessary that industry players should also use risk reducing, risk control and risk avoidance in the management of project. If industry players apply risk retention instead of any of the above-mentioned methods, the project achievement will definitely depressed the stakeholders' expectation.

The questionnaire survey results have demonstrated that *time risk* mainly is managed through risk control through the application of other resources such as human, financial and technique; all of which could assist in monitoring time overrun. The interview findings have further supported this standpoint by revealing the availabilities of various new and advance technologies to make the construction period shorter. For instance, dry construction such as precast concrete and advance techniques such as system formwork can reduce the time needed per work cycle.

Construction practitioners tend to employ different techniques to different kinds of risks. The risk responses are rated for different kinds of risks in this study. As a result, the findings in the study are hard to make a comparison to other previous similar studies since the risk responses of other studies are subjected to universal risks.

9.0 Conclusions and Recommendations

Risk response is the establishment of strategy to mitigate the potential threats and maximise the potential opportunities. Six (6) typical risk response strategies were used in the study to deal with risks are risk retention, risk reducing, risk control, risk sharing, risk transfer and risk avoidance. The selection of risk response must be appropriate to the significance of risk, cost effectiveness, timing project realistic, and agreed upon by the involved party. Different risk response should react to manage different kinds of risks to ensure its appropriateness.

Results from the present study indicates that risk retention is used in the management of *financial risk* while *time risk* is managed using risk control strategies aimed to prevent time overrun. Local players opt to use risk control to manage *personnel risk* and use risk retention to cope with *contractual risk*. Risk reduction is frequently used as the strategy for dealing with design and technical risk while risk transfer is preferred in managing safety accident risk. The intrinsic factors of risk response for financial risk and time risk are studied in the interview survey. As the major contributor of financial risk is the rising building material price, local builders held the view that financial risk factors are beyond people control. Industry practitioners tend to use risk control to manage time risk by applying new and advance construction technology or equipments.

This study could help in expanding the risk management knowledge in the Malaysian construction industry by increasing one's understanding towards the suitability of risk responses employed for different kinds of project risks. The findings suggest that there is a lack of knowledge and awareness of risk management in the Malaysian construction industry. The attitude of local construction players towards risk management implementation is disappointing too. Poor knowledge level of risk management has also been identified as another factor of concern. A standard risk management guide should be developed in the Malaysian construction industry.

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