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Systematic Critical Review of Risk Management in Malaysian Construction Companies

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ABSTRACT

In recent times, the Malaysian construction companies have been bedevilled by myriads of risk issues which have hampered their smooth operations. Emerging evidence has therefore revealed that the process of developing risk management is still at the primitive stage in many Malaysian construction companies. The need then arises for an adequate risk management study in order to curtail the inherent danger to the productivities of Malaysian construction company. The application of an effective risk management helps in the improvement of performance of any project with respect to the tripods of cost, time and quality. The paper follows an earlier work published by many researchers in which the authors analyzed the global construction industry with focus on the evolution of risk management. The future of construction is exciting in which international markets; technological innovations, and construction project management techniques and new relationships across disciplines, are all avenues for development. To make the best use of the opportunities, the MCI must invest in research and development (R&D), undertake public education about the field and develop new methodologies to improve operational performance in construction. This study proposed future direction in the management of some selection risk using a systematic review of related researches.

1. INTRODUCTION

The construction sector is one of the fast-developing sectors with remarkable economic impact (Abdul-Rahman et al., 2010). In recent years, Malaysia has secured pivotal roles in construction sector not only for economic growth but also in improving the quality of life and living standards of the Malaysian people (Raza et al., 2013). The construction sector plays a significant role with majority of job functions are usually carried out to fulfil the ever-increasing demands of any government. The provision of civil and mechanical functions is one of the most important roles in any construction company. Take for instance, Rasiah & Shari, (2001) reproted that Malaysia is categorized among the rapidly developing economy of the world with remarkable advancement in construction activities. Over the last two decades these has contributed between 3 to 5 percent of the aggregate economy GDP. It is worthy of notes that the Malaysian construction industrial boom started as early 1990s, just after the launch of vision 2020. Today Malaysian Construction Company continues to grow significantly in the domestic as well as at the international market (Raza et al., 2013).

Furthermore, the construction activities are closely linked with the various phases of economic development of any country. For example, it has been reported that under the Ninth Malaysian Plan between the year 2006 and 2010, the Ministry of Works projected a monetary intervention close to RM 30 billion (US$12billion) to help in the construction sector growth and development (Nah & Bunnell, 2005).These led to the operation peaked in 1995 with a GDP hitting an amazing threshold of 17.3 per cen,t comparable to the one recorded by many developed countries (Ondiek, Abdulrazak, & Njoka, 2010). Moreover, Malaysian government has a projection of achieving a high-income economy by the year 2020 (Unit, 2010). Then there will be an emergence of many construction activities to meet the demand of the forecasted economic growth of an "upper-middle-income economy" (Group, 2014). The

focus from this development is to improve the socio-economic sector such as the public transport, rural infrastructures and essential building services such as education and health (Adeleke et al., 2017; Arditi et al., 2017; Ansah et al., 2016).In addition, the Malaysian economy has therefore experienced a significant and rapid infrastructural development due to the emergence of petroleum industries which has resulted in government investing so much in related infrastructures such as the establishments of east coast (i.e. Gebeng and Kertih) and southern (i.e Tanjung Langsat) Malaysia (Razak et al., 2010). Also, many industries have benefitted immensely from the growth of petrochemical processing plants, with the inclusion of construction industries. This has resulted in an unimaginable vast investment in the LNG processing plants, trains, pipelines, refineries and shipyards (Othman, 2010).

The construction companies are more susceptible to many risks when compared to other industries. These risk is related to the key players such as the designers, engineers, and contractors involved in the construction works (Goh & Abdul-Rahman, 2013). These risks are generally considered as incidences that influence the principal objectives of a particular project such as the time, cost and quality as reported by Kimi et al., (2011). The construction industry is therefore exposed to greater risks in comparison with other industries due to their unique features such as long project durations, complicated processes, financial intensity, environment constraintsand dynamic organization structures. As a result of this, many constructions work in Malaysia consists of a high-risk process that requires a proper follow-up operation involving supervision, implementations and project completion.

Adnan et al., (2008) reported the prominence of higher risk level at the initial stage of any project and this is attributed to the high level of uncertainty. The initial stage of any construction project is always characterized with higher risk when compared to other stages which on the long run is liable to other risks thereby affecting the project output when proper risk management procedure is not well implemented (Goh & Abdul-Rahman, 2013)Consequently, the risk management in construction industries is an important process involving making an informed decision and the acceptance of common risk factors while taking proactive actions in mitigating its effects thereby minimizing the inherent threat to the environment and the end-users (Loosemore et al., 2012; Adeleke et al., 2016).

This review expnaxiated the construction projects' risk as an uncertainty entity which could affect projects objectives. Moreover, it is important to note that the management of risk in Malaysian construction industry is still under-developed and at the infant-stage with only few industries utilizing the appropriate tools in this regard (Riazi et al., 2011). The study therefore identified the actual process of risk management that is being applied in the construction projects and determined the effects of risk management implementation on the performance of the Malaysia construction industries in terms of projects duration.

2. LITERATURE REVIEW

2.1 The Concept of Risk Management in Construction companies

The era of progressive globalization has revealed risk an unavoidable phenomenon of daily activities most especially in construction establishment (Szymański, 2017). Risk management is then defined as a proactive process which helps to harmonize the different factors with inherent outcomes the action or inaction could cause (Adeleke et al., 2015). Chapman & Ward, (2003), categorized risks as known or unknown (uncertainties) with Jaafari (2001) defining the unknown risk as the probability of impact of project factors on its inherent objective function. He further postulated that certain events have a 100 % probability chance that it will occur, whereas unknown events have 0% probability chance of occurrence. Hence the concept of risk requires a proper understanding of uncertain events that can be measured also regarded as measured risk as supported by Serpella et al., (2014) and Tembo et al., (2017). Generally, risk is regarded as an event whose occurrence could have an adverse effect on time, cost, quality and other performance criteria (Francis et al., 2008); Siang & Ali., 2012). Moreover, there are many uncertainties associated with construction industries which make it one of the most dynamic, risky, challenging and rewarding establishments. The myriads of uncertainties and risk associated with construction companies could be traced to natural construction activities, environment, and organization configurationsa (Adeleke et al., 2015).

3. PROBLEMS FACED BY MALAYSIAN CONSTRUCTION COMPANIES

Many researchers had enumerated different problems facing construction work globally but but not many works have been conducted by academics and practitioners on the problems faced by local construction industry. In this review, the problems faced by Malaysian construction industries were elucidated using local/international journals, conferences, and conventions. However, very few writers such as: (Abdul Rahman and Alidrisyi (1994); Abdul Rahman et al. (2005); BIPC/CIDB (2003); Hamzah Hassan (2003); Imtiaz and Ibrahim (2005); Abdul Razak et al., (2010); Goh et al., (2013); and Nima (2001) reported the problems in the Malaysian construction industries. Abdul Rahman et al. (2006), have discovered 45.9 percent delays in projects completion at the initial stage and these delays are known to cause losses to the client/developer and to the entire industry due to their influence on the economy. In addition, Razak et al., (2010), a construction and project management consultant (PMC) in Malaysia since 1962, has revealed that Malaysian projects in the last decade were not cost and function effective. He further added that in certain instances the budget was exceeded, projected completion dates were not achieved, and quality was not always up to the expectation. Pratt emphasized the necessity for rectifying this anomaly in the new millennium. Similar views by Abdul Rahman and Alidrisyi (1994) that Malaysian construction projects faced delays in material arrival at construction sites caused delay in the completion of projects, and frequently a bulk of surplus material at site after project completion.

The investigation conducted by Goh & Abdul-Rahman, (2013) identified the financial and time risk as the major risks in the Malaysian construction industry. Both types of risk impact negatively on the project performance in terms of cost, time and quality. They have overriding impacts on project achievement, i.e., if the project can keep to the predefined budget or completion time. Financial and time risk is therefore identified as the most significant risks associated with the Malaysian construction industry. The drivers of financial and time risk were investigated with most of the local construction players having this believe that the late payment and escalation in material costs are the main causes of financial risk. Meanwhile, the time risk is always affected by other risks, such as technical risk, risk associated with uncertain weather, personnel risks; risk caused by an uncertain political climate and unstable construction regulations. These findings further confirmed that risks are interrelated; the incidence of one risk may trigger the occurrence of other risks. Also, Nima et al., (2001) studied on the construction material wastage revealed that the cost of materials exceeded 50 percent of the construction cost, depending on the type of construction. He indicated the reasons of such material wastage as poor workmanship, breakage in handling materials, setting out error, order not meeting specifications, excessive use of materials, material not meeting requirements, improper storage, and misdemeanor.

In the Construction Industry Development Board (CIDB) master plan for occupational safety and health (CIDB Master Plan OSHA, 2004), the problem such as delays, low quality, low productivity, poor image, economic volatility, shortage of manpower, and lack of data and information in Malaysia. The low productivity in the construction industry could be attributed to low technology usage, poor project/ site management, unskilled labour, high-input cost and duration estimation, shortage of construction manpower, high construction wastage, poor maintenance, nonconductive, and accident-prone environment. The poor image of the industry is as a result of high occurrence of accidents, absence of job security, poor management, and low wages for high-risk jobs and lack of opportunity for career development.

On a similar note, Ansah et al., (2016) highlighted the weak points of Malaysian construction sector as discipline in planning, and architecture. With these various fields of engineering and quantity surveying has been well established, however the important discipline of construction (which is the production function that deals with physical implementation of development projects) only recommended formal education and training just about two decades ago. The imbalance is between those who plan, design (both architectural and engineering), take-off quantities and prepare documentation (all known as consultants) and those who plan, implement and execute construction development projects (known as contractors).

It is therefore obvious that accelerated growth and development in the construction discipline or the production of construction is imperative. The weak points of the industry among others are: poor industrial image, lack of systematic and orderly education and training of skills in the industry, lack of appropriate recognition of status of

construction technicians and technologists, the confrontational attitude taken by the consultants and contractors, lack of team work approach and sense of belonging.

Interestingly, as at 2004 ending, the major development projects were confronted with different challenges such as delay in construction time, cost escalation and structural defects in school buildings and community college buildings. The PMCs, which supervises and manages various government projects, failed to control costs, design and scope of those projects, resulting in higher costs. It has been reported that the construction industry was fraught with delays in approval of projects, uncompleted projects, and poor quality of work, cost overruns and late payment to contractors. Similarly, problems in projects like new Pandan hospital, Middle Ring Road 2 project highway and KLIA have been reported in local newspapers of having problems during post occupation period. Due to the aforementioned weaknesses in the construction industries, the CIDB in collaboration with Building Industry Presidents Council held a roundtable discussion in June 2003 with presidents and chief executive officers of the MCI. The theme of the discussion was establishing priorities to improve the MCI for the future. Among the ten priorities identified and recommended for improvement, were the productivity and quality. Furthermore, it was also suggested that the construction industry employed automation, prefabricated products, new construction methods and techniques and industrialization, etc. in order to improve operational performance and the bad image of the industry. Also, Yusuwan et al., (2008) revealed that despite the spectacular growth rate; the MCI has not change much since the 1960s in terms of technology. Whilst the country's other major economic sectors have advanced tremendously in the utilization of modern technology, the construction industry still depends on old conventions of building techniques. The local construction industry therefore needs to undergo a marked evolution in its development and maturity, old construction practices, management and technology. This is to transform Malaysia into a modern and thriving country which need to be radically upgraded to meet the exact standard of building performance for the future. Expectation of high-quality finishing, tighter building schedules and the need to keep within budget will require superior construction technology and techniques. There is therefore a necessity for a decisive and quick interventions before many more become disillusioned with the industry.

Furthermore, there is a broad spectrum in the management of risk in construction projects which involves a systematic identification, analyses, and response in order to achieve the project objectives as supported by Adeleke et al., (2018). The exclusion of risk factors in its entirety is not necessarily a major point of concern for achieving higher performance in construction projects, and this is usually a cheap option. However, from the economic point of view, this approach is not that useful because it is potentially necessary to define risky activities that do not pose an economic risk and thus bringing no tangible benefits (Rittmeyer et al., 2017). It has been reported that risk can be avoided in construction projects and thus the principle of risk management is a tool which has an integral function in project management (Edum-Fotwe & McCaffer, 2000). The management of risk therefore preserved the reputation of the construction industry in terms of project performance and proper implementation. The implementation of risk management therefore help to forestall delay in project delivery, over-budgeting, improve project quality, and working environment. Hence, the risk management implementation is an important entity in making decision on construction projects.

An effective risk management is difficult to achieve in a construction project and this is one of the major drawbacks for many project managers thereby making it difficult to predict the future occurrence and the expected risks in construction projects (Tserng et al., 2009). To buttress this point, Adeleke et al., (2016) reported that risk tendency is usually over-prescribed in situations where emphasis is made on the techniques of risk management but not on the risk identification process. Tserng et al., (2009) stated the need for risk management to be conducted from conceptualization stage and throughout the project lifecycle, failure of which could lead to poor project performance (Abdul-Rahman & Pilouk, 2007). Moreover, Francis et al., (2008) reported that most of the current construction project is devoid of a formal risk management portfolio.

There is a need to effectively manage the inherent risk and overcome the lack of formality in the risk management of the construction industries achieve a good performance index in the manager's contractual obligations. Kululanga & Kuotcha, (2010) reported that low implementation of project risk management in practice results in projects failing to meet deadlines, cost targets and good quality performance. Project risk management has been intensively

discussed in recent years with many authors recognizing the risk management as one of the most critical procedures and capability areas in the field of project management.

The summary of these studies is succinctly highlighted in relation to the area of study, the participants involved, the method employed, data analysis tools used, and the results obtained as carefully presented in Tab. 1

Table 1 Summary of the previous investigation on risk management from the global point of view

No	**Authors/years**	**Area/country**	**Participants**	**Methodology**	**Data analysis method**	**Findings/variables**
1	(Abdul-Rahman et al., 2010).	Malaysia	Contractors, engineers, project manager and directors	Questionnaire survey and interview	Statistical method through computer program	Results have found 45.9 percent delays in the completion dates during the construction stage.
2	(Goh et al., 2013).	Peninsular Malaysia	Engineers, architects, contractors, developers	Survey questionnaires and interview	Data were analysed using mean item score and single factor analysis of variance	The findings show financial risk and time risk are identified as the major risks. The findings show that the emergence of financial and time risks is largely because of frequent late payments and poor planning that plague the performance of the local construction industry.
3	(Ansah et al., 2016)	Malaysia	Contractors	Semi-structured Interviews	RPN method	The findings from the analysis showed availability of labours, lack of technical know-how, use of old methodologies, inefficient dissemination of information, changes in government regulations as the highest risks.
4	(Adnan, Rahmat, Mazali, & Jusoff, 2008).	Malaysia	Main contractor and subcontractor	questionnaires survey	Ranking and factor analysis	Financial difficulties, manpower

						shortages, excessive owner change orders, are leading factors directly affecting contractor performance on construction projects
5	Abdul-Rahman et al., (2015).	Malaysia	Project managers	Interviews	Ranking and factor analysis	The result shows that construction projects in Malaysia mostly do not use risk management techniques, and only small group of construction professionals implement risk management in their projects.
6	(Al-Tameemy et al., 2018).	Malaysia	Contractors and managers	Questionnaire survey	chi-square ($\chi 2$) test	The result obtained Therefore, there is a high demand on quality cost training
7	(Raza et al, 2014).	Malaysia	contractors	questionnaires	Ranking and factor analysis	to enhance the site staff's knowledge and skill.
8	Amran et al., (2008).	Malaysia	clients, consultants, and contractors	questionnaires	Ranking and factor analysis	The result obtained show that Malaysian contractors consider the delay in payments and resolving contractual issue is most impact construction risk.
9	Yusuwan et al.,(2008)	Malaysia	Clients	Interviews and questionnaires	Ranking and factor analysis	The research concludes main causes of delay and ten most important
10	(Sian &Ali, 2012)	Malaysia	Projects managers	Interview approach	Statistical method through computer program	causes were: contractor’s improper planning, contractor’s

4. SUMMARY OF THE FINDINGS

In this study, the risk management in Malaysia construction projects was assessed. This assessment was carried out to ensure that every aspect of the identified risks is adequately. More so, review of risk management from several studies conducted in Malaysia revealed that various risk factors dampen the project output in Malaysian construction industries (Yusuwan et al., 2008; Ahmad & Buchanan, 2017; Ahmad et al., 2015; Siang & Ali, 2012). In many instances, past literature described the current view on the resultant effects of risks experienced in Malaysian construction projects. This is largely due to certain factors such as the change in government policies, contractor competence, delay in payment, how contractual issues are solved, financial failure, labour and equipment, and material availability, quality of work, and safety issues (Omar, 2009).

Generally, this study carefully identified the financial and time risk as the major risks experienced in the construction companies in Malaysia. The findings revealed that the emergence of financial and time risks is largely because of frequent late payments and poor planning hampering the performance of local construction (Siang & Ali, 2012). This is mainly due to the lack of proper risk management and its importance for a better project implementation. This could lead to good quality performance amongst project team members. In many instances, the risk is often managed only when it occurs and this impact negatively on the project's performance in terms of cost and time. It was also discovered that most project managers use some risk management techniques with adequate awareness about the state of the art risk management tools and techniques.~~,~~ Hence, it ~~a~~ important to raise proper risk management implementation awareness among Malaysian construction industries as buttressed by Abdul-Rahman et al., (2015).

5. CONCLUSION AND FUTURE DIRECTIONS

In conclusion, this study briefly addressed the research effort which is still in progress. This study synthesizes the risks factors influencing the Malaysian Construction industries and accordingly proposes future directions. To achieve this, a systematic review of related articles was conducted. This was made up of selected 21 published articles on construction project-related journals for better improvements. The results obtained implied that challenges such as material, financial and design risk will continue to exert pressure on Malaysian construction industries. This is because the import of vital equipment and materials will raise cost above specified budget, thereby increasing the overall cost of the project. The present study suggests that the level of knowledge of the teams involved in project implementations should be of paramount important as **well as** that of the top management. This is necessary to better achieve successful project implementations within the stipulated cost, time and quality which will invariably benefit future research within risk management. The Malaysian construction industries therefore need to find new innovate operational and productivity instruments in order to have a competitive advantage in the local and global markets. Moreover, the construction industries need to prepare for paradigm shifts in order to improve its competitiveness using good practices, advanced construction risk management techniques and optimize resources utilization. It is pertinent to note that increasing productivity is an untapped area that needs improvement in construction industry. Moreover, companies that embrace new technologies, innovative processes, collaborative partnering, improved safety and reduction in litigation costs through contract arrangements will have a significant advantage over those that continue with past practices. It is only with enhanced capabilities and capacity can the industry withstand challenges in good and bad times. There is no doubt that substantial improvement in quality and efficiency is possible.

CONFLICT OF INTEREST

The authors of this manuscript declare no conflict of interest.

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