Development of Risk Response Model to Handle Delays of Construction Projects

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Abstract— Due to the complex nature of construction projects, delay risks are more widespread in the construction sector than elsewhere. This poses a problem for the industry, since it is already at risk because of the recent recession due to COVID 19 Pandemic, the financial crisis arrested economic development in the construction sector with the result that investors' confidence in the sector is severely depressed. In this situation, effective risk response is urgently required, since it aims to ensure that all project objectives, including avoiding delays, are met. In itself, the risk response process is a core element of risk management and perhaps the most important area needs to be improved. The aim of this project was to develop a model for effective risk response to help in controlling delay risks. First, the strengths and weaknesses of current risk response processes have been analysed through a comprehensive critical literature review. Common causes of delay risks have been identified and various traditional measures used for their control have been critically reviewed. The greatest deficiencies in all published measures of delay risks control in construction projects are related to the lack of risk response development and appropriate measures (preventative/mitigating), within the risk management process.

Keywords: Risk Response Model, Construction Projects, COVID 19 Pandemic

I. INTRODUCTION

Risks that materialise in any type of project can cause losses, increased costs, time delays, and a drop in quality and clearly, any one of these outcomes will result in client dissatisfaction Previous research has identified the slow pace of development of risk management as a managerial discipline, attributing this essentially to immature organizational systems, and to a lack of education and training in risk management, which in real terms is almost non-existent. Indeed, it has been argued that the prevailing management system is more of an obstacle than a support to the development of efficient and effective risk management. It is claimed that the use of the informal and traditional management system is not enough to achieve control over risks such as delays. This idea is supported by other researchers who believe that project risk is escalated by poor project management and the lack of integrated systems, an issue picked up also by Ren and Yeo (2009) who observe that risk management requires complete knowledge of the entire project, and an acknowledgement of the need to ensure value creation and profitability so they claim to develop a multilevel framework for the risk management

Sarshar et al. (2000), In this undertaking it is important to recognize that the more complex a project, the greater possibility that more individuals/organizations will be involved, and in this respect, the owners of each potential risk must be identified, and involved in the planning to ensure suitable risk mitigation by the consideration of several different response options. At that point also, the mitigation strategy for risk response development should be assessed according to its capability, and that may be different from one project to another.

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Gunduz, M.; Nielsen, 2013 - The low level of contractor experience can cause chaos as heis the key connection between all subcontractors and hispoor experience can collapse the wholeproject

Mohammadsoroush, T.2017 - Especially in the manufacturing/industrial projects, material related points shall be of top priority. Late procurement will lead to late delivery and late project submission. The lack of finance can lead to many other causes of delay suchas the delay of procurement of material.

Bagaya, O.; Song, J. The lack of information means theinability to take the right decision at the right time. Lack of commitment and contractor's inefficiency

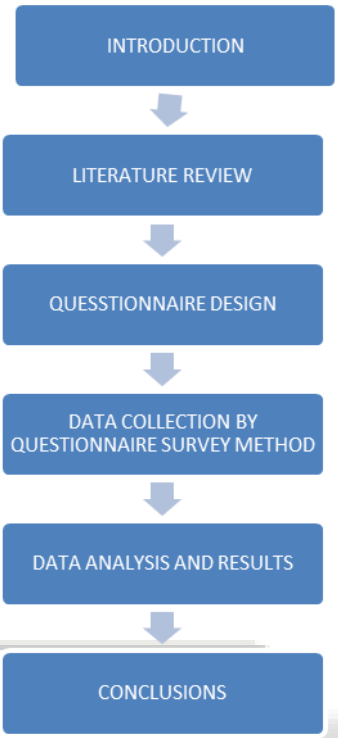
II. OBJECTIVES

The research aims to develop a model for effective risk response to control delay risks effects. In fulfilling this aim, several objectives must be achieved, and these are given as follows:

1) To conduct an extended literature review of construction delay risks.
2) To investigate key success factors (KSFs) of preventative and mitigation measures of risk response for delay risks control.
3) To identify the priority of stakeholder capability for handling risk response development.

To outline a risk response development model for post COVID projects in New Normal conditions

III. METHODOLOGY



IV. QUESTIONNAIRE DESIGN

Causes of delay in construction projects is an important function that has got the attention of both researchers and field experts. Therefore, it was important to identify those causes of delay in order to avoid those causes, have a solution for them in case they happen, and eventually save time and money. It is essential to tie the causes of delay with the geographical location as by experience, it is found that different locations have different regulations, practice, authorities, etc. Additionally, the field of study is also important as for example, most studies focus on the construction and building projects but less focus on the industrial/manufacturing projects. As the field of work changes, different requirements, regulations may well change, and a completely different behavior might be encountered. This paper focuses on the industrial/manufacturing projects. The paper focuses on the causes of delay in such projects.

The research methodology is carried out as per the objectives of the study. The study started by reviewing the literatures and interviews from various site workers. In this, questionnaires were used as tool for collecting data for quantitative analysis. The cause for using a questionnaire is that the options of responses can be acquired in a structured manner, according to questionnaires are the most common method used to identify the practice of companies. Although designing a questionnaire appears to be relatively simple, it is a complex process. The questions must be formulated and selected carefully and the aim of the project must continuously be borne in mind.

The questionnaire was developed to quantify the significant index for

1) Risk factors of delays (causes and effects) and how they are managed according to the traditional method.
2) Key Success Factors (KSFs) of Preventative measures for risk response development to control delays.
3) Key Success Factors (KSFs) of Mitigation measures for risk response development to control delays.

In respect of (2) and (3) the researcher asked the respondents to refer to real examples from their work and to consider the relationship between top KSFs for risk response development from their professional position. At the end of the questionnaire, space was provided for the respondent to add any comments s/he felt s/he wanted to make.

V. ANALYSIS AND RESULTS

The data analysis will be done after the data collection is finished. All the data collectedfrom the questionnaires will be analyzed and then summarized to obtain the appropriateand suitable result.

This study has focused on the development of risk response for construction projects delays and has specifically concentrated on the delay risks that mainly affect time and cost since costs associated with delay risks in construction projects

- The first objective was to undertake a critical literature review that explored the importance of risk management theory in project success as identified by the Association of Project Management (APM), and the Project Management Institute (PMI). The concept of 'maturity' in this concept is, however, found to have the potential to create the essential conditions for optimal risk response in respect of the identification and assessment of risks, and therefore, the literature was reviewed quite specifically for contributions under the umbrella of 'maturity' since such an approach allows managers to determine whether a risk has changed in nature, increased or decreased.

  There are also new top delays factors like late approval starting/completion certificate, poor design and delays in design, poor dedication/reliability of sub-contractors, difficulties in supply of electricity and water, unqualified project managers, increased cost of materials, lack of team communication/ co-ordination, and slow response and poor inspection by consultants.
- The second objective of the study was designed to answer the second research question, that being: do construction organisations identify any key success factors (KSFs) of preventative and mitigation measures for risk respond development for construction project delays? In order to pursue this objective, the practitioners/respondents were invited to provide the most effective key success factors (KSFs) of preventative and mitigation measures from their experience.

  The third objective of the research was to identify the priority of stakeholder capability for handling risk response development. In this matter, the study revealed that professionals in the field of project management were considered as being more important than any other

stakeholders in handling the complexities of risk response development. In this respect, more than 50% of respondents agreed on the need for the assistance of Expert Project Managers in the development of the response to control delay risks. After prioritising the need for such experts, the respondents believed that Clients, Construction Managers and others came next in the order of importance in handing the risk response development.

A. Development of the Risk Response Model

The fourth objective of the research is addressed in this section, which shows the development of the Risk Response Model.

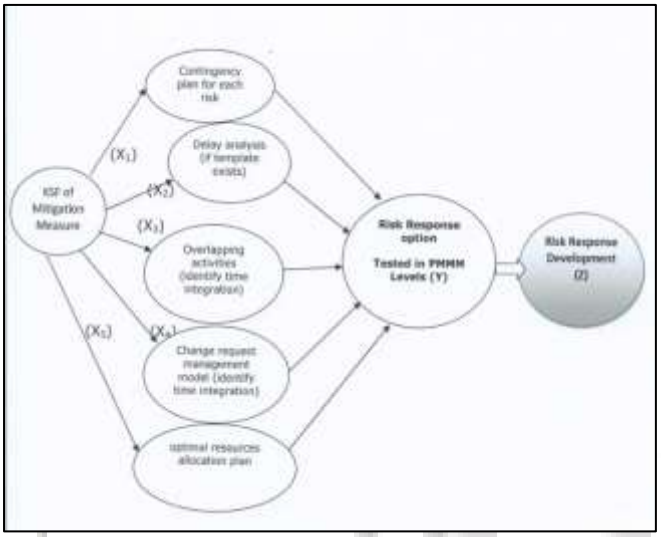


Fig. 1: Hypotheses of Mitigation Measures and Maturity levels in PMMM for Risk Response Development

Evidence was clear during the interviews with the companies' personnel that model development was indeed necessary, since when asked 'What level of maturity do you implement?' the interviewees replied to the effect that the maturity was at levels 1 and 2 only. For example, there was informal gatherings to discuss the strategies to deal with the risk events (level 2), contingency plans for near-term risks, and mitigation strategies only for larger projects (level 2), applying three types of KSFs of mitigation measures for risk response (the Change Request Management (X_4), Overlapping Activities (X_3), and Contingency Plan for any new risk item(X_1)). In another case study Organisation applies a Contingency plan for any new risk item (X_1) for design change (plan B) and as planned this should be provided on time, but it does not reach the satisfied maturation level in PMMM, since it is only for larger projects that a Contingency plan for near-term risks and mitigation strategies is provided (level 2). At the same time, in the thirdOrganisation, while a Contingency Plan for any new risk item(X_1) has been considered for risk response, scaling by determination of contingency plans for the future is infrequent (level 1), and there are only informal strategies in place to deal with (foresee) the risk events (level 2). In fourth organisation, risks are measured as they arise (level 1) and determination of mitigation strategies or contingency plans for the future is seldom (level 1), informal gatherings are held to consider strategies to deal with the risk events (level 2), there is a Risk Management plan that documents the procedures to manage risks (level 2), contingency plans for near-term risks and mitigation strategies exist only for larger projects (level 2), and the Delay Analysis Template (X_2) is applied as a KSFs of mitigation measures for risk response. In 5thOrganisation, the Optimal Resources Allocation plan (X_5) is identified as one of the KSFs of mitigation measures, the risk response option is classified in PMMM by the Risk management plan that documents study Organisation used the Optimal Resources Allocation plan, and it is in level 2 of the Risk Management plan that documents applicable procedures to manage risk. Fortunately, the risk response reached level 3 in PMMM by the identification of each risk and mitigation strategy. In Case Study Organisation F, a Contingency Plan for any new risk item was used wisely by the project manager to catch up on the completion date of the project. In this respect the risk response process involved the regular use of templates, showing the acquisition of level 3 in the PMMM and reflecting the capability of the organisation to capture and share the best practice in risk management

Based on the research work, the following conclusions can be drawn: An extended literature review of construction delay risk has been carried out. Previous attempts to identify and assess delay risk factors in the construction industry is conducted with ineffective processes that not embrace proper risk response strategies for delay risks control.

In pursuing the second objective, significant key success factors (KSFs) of preventative and mitigating measures have been identified. These measures provide an appropriate scale for developing construction projects and ensuring their success. It has been shown that mature practice can be developed and found in top preventative and mitigation measures, and the improvements can be identified. The significant gap between what is advocated in the literature and what is happening in the field has also been contrasted. Not surprisingly, mitigation measure in particular can be the driver for risk response process development

VI. REFERENCES

[1] Arditi, D.; Akan, G.T.; Gurdamar, S. Reasons for delays in public projects in Turkey. Constr. Manag. Econ. 1985, 3, 171–181.
[2] Ashley, R.; Jaselskis, E.; Lurie, C. The determinants of construction project success. Proj. Manag. J. 1987, 18, 69–79.
[3] Okpala, D.C.; Aniekwu, A.N. Causes of High Costs of Construction in Nigeria. J. Constr. Eng. Manag. 2009, 114, 233–244.
[4] Winch, G. The construction firm and the construction project: A transaction cost approach. Constr. Manag. Econ. 1989, 7, 331–345.
[5] Dlakwa, M.; Culpin, M. Reasons for overrun in public sector construction projects in Nigeria. Int. J. Proj. Manag. 1990, 8, 237–241.
[6] Conner, K.R. A Historical Comparison of Resource-Based Theory and Five Schools of Thought Within Industrial Organization Economics: Do We Have a New Theory of the Firm? J. Manag. 1991, 17, 121–154.
[7] Barney, J. Firm Resources and Sustained Competitive Advantage. J. Manag. 1991, 17, 99–120.

[8] Mansfield, N.; Ugwu, O.; Doran, T. Causes of delay and cost overruns in Nigerian construction projects. Int. J. Proj. Manag. 1994, 12, 254–260.
[9] Assaf, S.A.; Al-Khalil, M.; Al-Hazmi, M. Causes of Delay in Large Building Construction Projects. J. Manag. Eng. 2002, 11, 45–50.
[10] Couto, J.P.; Teixeira, J.C. The Evaluation of the Delays in the Portuguese Construction. In Proceedings of the CIB World Building Congress, Cape Town, South Africa, 14–17 May 2007; pp. 292–301.
[11] Arantes, A.; Da Silva, P.F.; Ferreira, L.M.D.F. Delays in construction projects—Causes and impacts. In Proceedings of the 2015 International Conference on Industrial Engineering and Systems Management (IESM), Seville, Spain, 21–23 October 2015; pp. 1105–1110.
[12] Alkass, S.; Mazerolle, M.; Harris, F. Construction delay analysis techniques. Constr. Manag. Econ. 1996, 14, 375–394.
[13] Aibinu, A.A.; Jagboro, G.O. The effects of construction delays on project delivery in Nigerian construction industry. Int. J. Proj. Manag. 2002, 20, 593–599.
[14] Sambasivan, M.; Soon, Y.W. Causes and effects of delays in Malaysian construction industry. Int. J. Proj. Manag. 2007, 25, 517–526.
[15] Chan, D.W.M.; Kumaraswamy, M.M. A comparative study of causes of time overruns in Hong Kong construction projects. Int. J. Proj. Manag. 1997, 15, 55–63.
[16] Yang, J.-B.; Wei, P.-R. Causes of Delay in the Planning and Design Phases for Construction Projects. J. Archit. Eng. 2010, 16, 80–83.
[17] Pourrostam, T.; Ismail, A. Significant Factors Causing and Effects of Delay in Iranian Construction Projects. IACSIT Int. J. Eng. Technol. 2011, 5, 450–456.
[18] Fallahnejad, M.H. Delay causes in Iran gas pipeline projects. Int. J. Proj. Manag. 2013, 31, 136–146.
[19] Oshungade, O.O.; Kruger, D. A Comparative Study of Causes and Effects of Project Delays and Disruptions in Construction Projects in the South African Construction Industry. J. Constr. Eng. Proj. Manag. 2017, 7, 13–25.
[20] Hwang, B.G.; Zhao, X.; Ng, S.Y. Identifying the critical factors affecting schedule performance of public housing projects. Habitat Int. 2013, 38, 214–221.
[21] Mohammed, K.A. Causes of Delay in Nigeria Construction Industry. Interdiscip. J. Contemp. Res. Bus. 2012, 4, 785–794.
[22] Doloi, H.; Sawhney, A.; Iyer, K.C. Structural equation model for investigating factors affecting delay in Indian construction projects. Constr. Manag. Econ. 2012, 30, 869–884.
[23] Annual Report 2011/2012 Report No. 20 of 2011–2012 for the period ende March 2010; Union Government Defence Service (Air force Navy): Mumbai, India, 2012.
[24] Parikh, G.M.; Joshi, D.J. Modelling for time overrun prediction due to disputes in highway projects in India. IMPACT Int. J. Res. Eng. Technol. 2013, 1, 23–34.
[25] Yang, J.B; Chu, M.Y.; Huang, K.M. An empirical study of schedule delay causes based on Taiwan's litigation cases. Proj. Manag. J. 2013, 44, 21–31.
[26] Aziz, R.F. Ranking of delay factors in construction projects after Egyptian revolution. Alexandria Eng. J. 2013, 52, 387–406.

