IDENTIFICATION AND MODELLING OF CONSTRUCTION SUPPLY CHAIN RISK TRIGGERS

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Abstract

The primary research problem was to identify and study the nature of triggers of construction supply chain risks within the context of the Sri Lankan construction industry. All of the important supply chain risk owners of the construction supply chains such as construction contractors, materials suppliers, consultants, client and construction industry as a whole as well as risk triggers created by them were considered in the research and this level of research has not been conducted before. The construction supply chain risk triggers are identified and categorized under construction industry specified risks, stakeholder generated risks and materials supply related risks. Stakeholder generated risks are further categorized as client generated risks, consultant generated risks and contractor generated risks. This is the first time in the literature, which used a holistic categorization for construction supply chain risks. Construction industry specified risk triggers are all types of risks from the construction industry/country/global context which are broken into the sand problem, regulations, seasonal trends and labour problem. Stakeholder generated risks triggers are contractor generated risks, consultants generated risks, and client generated risks. Contractor generated risks triggers are planning risks, decision making risks, financial risks, communication risks and sub-contractor risks. Client generated risk triggers are risks on communicating the scope of work and risks on fund supply. Consultant generated risks triggers are risks on submitting accurate designs and estimates. Materials supply related risk triggers are materials supply related quality risks, materials supply related availability risks, materials supply related on time delivery risks, materials supply related price risks. This is the first time in the literature, which used risk triggers to classify construction supply chain risks. Further, the research presents an interaction model the Risk Relationship Diagram (RRD) explaining the risk triggers and their impacts in the construction supply chains considering all the supply chain partners. The RRD can be used as a tool to assess the impact of triggers created by each stakeholder on others or how the triggers created by other stakeholders will affect each stakeholder. The model is useful in academic and practitioner perspective to investigate risk triggers at various points of the supply chain and to assess the risks and mitigation methods. Equations are derived to explain the relationship between each of the risk owners and respective risk triggers. Using the respective equations, each respective risk owner generated risk in value of money or time for a past project/contractor/consultant/client/materials supplier can be calculated. Using the answer, the perceived risk for each of the respective risk trigger for future similar project/contractor/consultant/client/materials supplier can be calculated. Using this model, the total risk impact for a given construction project can be derived. It is identified that the human generated risks, infrastructure/resource limitation risks and unavoidable risks are deep rooted primary risk triggers of any of the construction supply chains. However, the results presented are based on the Sri Lankan context and when the findings are applied for different socio economic context, the methodology explained can be used to a good extent but the models should be verified with the new context-This study reveals the risk profile of the Sri Lankan construction industry also. Further, twenty five risk topics were identified for the Sri Lankan construction supply chains. This research reveals twelve methods of risk identification as a holistic approach of construction supply chain risk identification. The methods can be used with suitable modifications to identify risks in any other supply chain also. The Double Triangulation Methodology introduced in this research can be applied in other research as a viable research methodology. In the Double Triangulation Methodology, it is suggested that it is compulsory to validate the results using minimum two other different data sets/two other approaches (ex: both qualitative and quantitative approaches).

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List of Abbreviations

BCP	- Business Continuity Planning
CSCM	- Construction Supply Chain Management
CSCMP	- Council of Supply Chain Management Professionals
CTR-Cost	- Time-Risk diagram
COQ	- Costs of Quality
EPC	- Engineering, Procurement and Construction
ERIC-S	- Evaluating Risk in Construction–Schedule Model
HRBS	- Hierarchical Risk Breakdown Structure
ICTAD	- Institution of Construction Training and Development
JV	- joint venture
MSCM	- Manufacturing Supply Chain Management
PERT	- Project Evaluation and Review Technique
RC	- Risk Cycle
RO	- Risk Owner
RRD	- Risk Relationship Diagram

RT - Risk Trigger

RC - Risk Classification

VMI - Vendor Managed Inventory

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