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Assessment of Critical Risks and Influence on the Success of Construction Projects

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Abstract: Risks plays significant part in the construction projects success. Risk identification and assessment failure may result to inefficiency in the procedures of managing risks, in which may critically have an impact on the projects' resources. A proper risk management is hardly applied in construction projects as a result of the lack of contractors' awareness of critical risks. The purpose of this paper is to base its focus on the examination of risk factors in construction projects.
Keywords: Risks, Risk Management, Risk Assessment, Project Success, Construction Projects.

INTRODUCTION

Risks are the likelihood of events or accidents occurring that may interrupt the general goals of industry [1]. Risks have also being stated as a "variation of many state of conditions concerning various unknown, unexpected occurrences, commonly unwanted and frequently random aspects", it has also been denoted risk as "an undefined incident or situation that, once it occurs, it may have an impact on a project objective either positively or negatively**".** Jaafari [2], additionally, articulated risk as "the exposure to loss, gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude", while Abbasi *et al.*, [3] considered risk as "the possibility of loss, injury, disadvantage or destruction". Similarly, Berk & Kartal [4] termed risk as "the possible unexpected happenings of an event or activity".

Risk management has been considered as one of the key processes and significant knowledge area in the project management field [5, 6]. Due to the uniqueness and dynamism of construction projects, uncertainties, multiple intricacies, different techniques and methodologies and diverse environments are involved in construction projects. Therefore, identification and management of potential risk factors, which significantly diverge from project to project depending on several environments, plays a critical role in improving the performance and realizing successful innovation to the enterprise.

Therefore, it is practical to measure the possible positive risk factors to improve the productivity boundaries of construction contracts, it is critically significant to analytically identify, categorize and assess the possible risk factors which can adversely impact the performance of projects. Therefore, this study focuses on the inimical aspects of risks encountered along the course of the construction process.

Though risk management is a methodological and comprehensive approach driven towards "indentifying", "analyzing" and "responding" to risk factors to accomplish the project objectives [7], most construction risk management plans are still based on intuition, personal experience and professional judgment, where formal techniques are hardly applied due to absence of knowledge and uncertainties on the appropriateness of these strategies for construction activities [8]. Nonetheless, in comparison with the "analysis" and "response" stages, the "identification" process of the possible risk factors is regarded as the single most important and puzzling stage, in which the entire risk management strategy is reinforced [9].

Effective risk management through reducing the general business risks by logical risk management may respond to the transformations of internal and external business environments (e.g. global financial environment, emerging technologies, customer needs) (Committee of Sponsoring Organizations of the Tread way Commission). Major characteristics of risk management are linked to sequences of product failures and managerial errors [1].

Construction Industry

The construction industry is considered as one of the key contributors towards a country's economy mostly accounting for 7-10 per cent of the gross

domestic product (GDP) value. However, construction projects frequently play a significant role in the safety, health and environmental aspects of the society [10]. The construction industry has been regarded as having the most dynamic, risky and challenging features, though with a slightly weak repute in risk management compared to other industries [11]. Due to the complexity and strategic nature of the construction industry it has been regarded as a risky business as it faces a various project stakeholders, internal and external factors thus leading it to huge risks. The rate at which projects in this industry has been cancelled and challenged compared to all other industries is the highest [12] Due to uncertainty happenings businesses incur in this sector, meeting projects' planned objectives in the utmost cost effective manner and at the required quality has been a challenge. Conversely, No construction project is risk free. Risk can be managed, minimized, shared, transferred, or accepted, thus, it cannot be ignored due to it being a multi-facet concept according to [13].

Project risk management has been bothered by identifying, analyzing, and responding to project risk. In the construction industry perspective, risk is the probability that a certain event or combination of events occurring during construction process. Construction encompasses several factors, and thus being difficult to define its cause and effect, dependence and correlations. Therefore, the perceived risks play an important part in making project decisions and hence may have several effects to project performance [14]. Risk is exposure to the concerns of uncertainty. However, subjective analytical methods that depend on historic facts and the capabilities of personalities and corporations have been relied upon in the assessment of the impacts of construction risk and uncertainty. Consequently, Risk assessment is a method that purports to isolate and assess risks impacted upon by a project.

A construction project is overwhelmed with different risks in all the phases of the project life cycle [15]. Hence, Risk Management must be stressed in construction project, irrespective of the project size to guarantee the accomplishment of project objectives [16]. Risks have been characterized as undefined future occurrence by construction managers and researchers and so they tried to control systematically through risk management and analysis method since early stage of 1990's.

To achieve a project from the conceptualization stage to end point, the undertakings and changes within organisations must involve complex, regularly bespoke and time-consuming design and include costly production processes. Construction projects are grounded on cooperation within various skilful and concerned stakeholders, and the co-operation amongst them is molded about extensive, disparate and interrelated practices [1]. Such complexity is further increased by many external environmental factors such as political, legal, cultural, sociological, technological resources and economic. Hence, a systematic risk management process can help organisations to identify not only the involved risks of projects, but also to mitigate impacts of those uncertainties in different phase of projects.

Statement of Problem

The construction industry has experienced for long adversarial working relationships, conflicts, disputes and poor collaboration among others between various stakeholders such as the client and the main contractor, consultants and contractors or suppliers and subcontractors [11]. This adversarial relationship impedes competitiveness and overall efficiency of the industry; while claims by contractors for additional payments are the major source of difficulties in the industry. These have been brought about construction industry being reflected as an uncertain business as a result of its intricacy and premeditated nature. It experiences a several project stakeholders both internal and external factors which cause enormous risks. The degree of cancelled and collapsing projects in this industry is amongst the top compared to other all industries [12].

In addition [14] observed that the increasing complexities of buildings, the need to reduce designs and construction periods, the need to improve project performance have brought pressure to find alternative means of project delivery. Similarly, Sakal [17] observed that construction projects have become dynamic in nature due to its increasing complexity and uncertainty; and the need to embrace change in order to achieve truly outstanding project outcomes of reducing project costs and design/construction time while still maintaining high quality final products.

Notwithstanding that construction risk factors may be comparable across the globe, several variables pertaining to a local industry, such as socioeconomic, environment and cultural issues, can further contribute to unknown or unpredictable risks**.** Comparable projects, furthermore, completely might have differences in risk features in varied regions [6].

According to the Kenya National Bureau of Statistics [18], the construction industry has been facing a lot of challenges in quality assurance from collapsing of buildings and constructions on road reserves and public utility spaces. This is compounded says the Ministry of Public Works by some local authorities lack of capacity to facilitate the implementation of quality control hence quality assurance is left to public health technicians. The ministry points out that majority of the professionals are competent to offer good quality advice and service. But, some give poor service through poor documentation, poor decision making and extension of time variation. From this disconnect that has been

witnessed between project managers and the employers key personnel leading to lack of appreciation of each other's role.

Risks role they play has been critical to the success of construction projects. Failure in identification and assessment of risks has led to inadequacy in risk management process, has critically affected the projects' resources. A proper risk management is hardly exercised in construction projects due to the lack of contractors' awareness of critical risks [11]. This is as a result that some contractors deliberately tender at low rates with the aim to later canvass for change in specifications if awarded the contact. Some of them frustrate the contract and eventually submit very huge claims creating loopholes of bureaucracy and poor decision making process.

The ministry found that fraud and unethical practices have been common in the sub-sector. "This may occur through the use of inferior materials or sub-standard mixtures, example, use of undersize steel bars, wrong concrete mixed, and poor quality paint. Some professionals have been known to collude with contractors at the expense of their client by adulterating documents." According to the study corruption and unfair distribution of construction projects is common while procurement process need to be reviewed as it causes unnecessary delay of payments. He added erratic change of prices of building materials are some of the challenges facing this Kenyan sector.

Construction industry is enormously prone to risks, with complexity and dynamic project environments which create an atmosphere of high uncertainty and risk. The industry is exposed to numerous technical, socio-political and business risks. The track record to manage these risks has been not well dealt with in construction industry. This is due to the persons operating in the industry endure numerous failures, such as failure of abiding by quality and operational requirements, cost overruns and uncertain delays in project completion [19]**.** The purpose of this paper is therefore to review the existing theoretical and empirical literatures with a view to identifying the linkage between project risk factors and success of construction projects.

The study is guided by the following objectives; first, to review the theoretical and empirical literature on the concepts of critical risks, project management competencies and success of construction projects. Secondly, the study ascertains the emerging theoretical and empirical gaps that form the foundation for future research and finally proposes a theoretical model for reacting to the identified gaps. The paper contributes theoretically to the body of knowledge by providing a link between critical risks, project management competencies and success of construction projects. This link plays a critical part in enhancing the theoretical understanding of the concept of risk management and the phenomenon it outlines in the operations of construction industries. Such knowledge is reflected crucial for use in the management of industries in the construction sector. Towards this, the paper proposes a theoretical model that is perceived applicable in guidance of future research in this area.

Theoretical Review

The paper will consider the postulates and contributions of the: resource dependency theory, project risk management process, risk management theory and contingency theory

RESOURCE DEPENDENCY THEORY

RDT was presented in by Pfeffer & Salancik's [20] book titled The External Control of Organizations: A Resource Dependence Perspective. The RDT framework offers an understanding of organization-environment relationships and outlines the associations (and dependencies) amongst resources, power and organization-environment.

RDT is frequently used to describe by what method organizations ease environmental interdependence and uncertainty [21]. Illustrating from organizational theory, RDT describes the organization as system which is open [22], and is grounded on the proposition that all organizations are not independent and are controlled by critical reliance on other organizations for the endowment of critical resources [23].

Furthermore in RDT, organizations strive to succeed their environments and decrease their reliance, uncertainties and other's control above them through inter-organizational relations engagements. Pfeffer and Salancik noted that: "Organizations inevitably never manage all external interdependencies, and any actions produce new patterns of dependence and interdependence, which in turn produce inter-organizational as well as intra-organizational power, where such power has some effect on organizational behaviour".

Davis and Cobb [24] isolate three main concepts of the RDT framework: social context matters; organizations have strategies to improve their independence and follow their interests; and power (not just rationality or efficiency) is vital for comprehending internal and external activities of organizations.

Pfeffer & Salancik propose the resulting five activities which firms can partake to diminish environmental dependencies mergers/vertical integration; joint ventures (JVs) and other inter-organizational relationships; boards of directors; political action; and executive succession. Organizations take part in inter-organizational engagements to deal with interdependencies, reinforce

their legality and reinstate certain degree of control (autonomy) above their environments [24, 23].

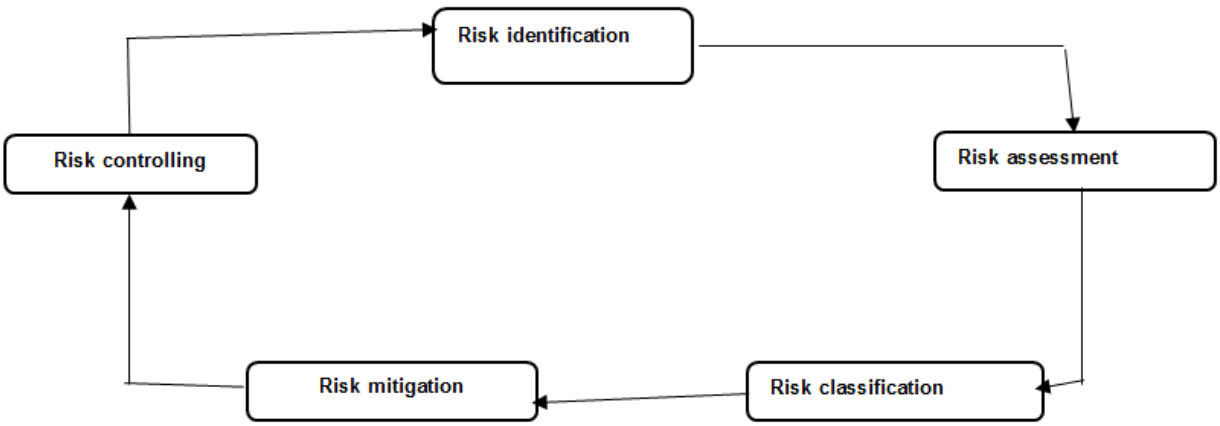
According to Drees & Heugens [23], "Implementing such arrangements enables organizations to set their boundaries 'at the point that maximizes strategic control over crucial external forces'". There is significant empirical study supportive to the reasoning that resource dependencies are a predecessor to mergers, alliances, JVs and board interlocks. Hambrick *et al*., [25] Hillman *et al*., [21] deliberated that current study proposes that from the era between 1980 and 2000, there was substantial proof that firms remained involved in resource-dependency relationships to lessen their general environmental dependency.

Finally, the RDT perception is also significant to project management as it emphases in what way organizations (or project managers) can cope with their external environment and ease their dependencies and uncertainties. As earlier discussed, every project is subjected to the triple constraints of time, cost and scope. Resource accessibility (availability) is also an additional project constraint due to internal and external organizational factors. However to cope with these constraints, organizations need to often employ strategic policies such as JVs, alliances, outsourcing/subcontracting and other inter-organizational relationships forms, which may offer extra resources and support in accomplishing the iron triangle purposes and providing a prosperous project. Moreover, some organizations may lack the crucial competences, or may face unavailability of resources due to other conflicting projects, and may hence decide on subcontracting certain components such as the design component or close-out procedures, to other organizations specializing in these fields [26].

There are various dynamics to contemplate when determining whether to participate in inter organizational relationships and which firms to employ with. Application of the RDT perception can thus help in provision of a more strategic approach and assisting project stakeholders to understand their own project environments and the available resources they are reliant on from external organizations.

Project risk management process theory

The risk management process normally comprises of five phases that, preferably, are repeated periodically throughout the project's lifecycle: planning phase, assessment of alternatives, execution, operation and evaluation of variations which may occur in transactions, renovation or liquidation. Cause-oriented risk identification is the first and most crucial step in project management process and the risks only identified can be managed. Once the risks are identified, they are assessed (monetary effect assessment) which is the second step. The third step is risk classification, which deals with prioritisation of the risks identified and assessed. The fourth step, risk mitigation, analyses what mitigation alternatives are applicable for each risk identified and which combinations of actions minimise the project risk situation overall. The fifth, and last, step is risk controlling, which compares the actual project position with the original project plan to control the effectiveness of the risk mitigation actions [27].



Source: Adapted from Girmscheid (2013) [27]

These project risk management steps should be conducted at as detailed a level as necessary and should be kept as simple as possible. This suggestion reflects the typical conflict of aims to characterise project risk management. For effectiveness, the output quality should be maximised, whereas for efficiency, the resources required should be minimized [28].

The risk management steps are evaluated and labelled as "required", "optional" and/or "reasonable". Risk identification is required and reasonable for every complex project. Proper risk identification is a precondition for all subsequent steps. The risk identification corresponds to a cause analysis. Understanding the cause of a risk event is a

precondition to understanding the effects of the event, and understanding both the cause and effects is a precondition to determining the best risk mitigation actions. Likewise, risk assessment is required and reasonable for every complex project. Risk assessment could be considered an effect analysis and allows the evaluator to put a "price tag" on the identified risks [29]. The risk classification, in contrast, is an optional step that is reasonable if the risks need to be prioritised for further treatment because of limited resources. Risk mitigation is a very reasonable and highly recommended step, because most benefits to the project can be generated. Although all previous steps analyse the situation, risk mitigation serves to derive actions for project risk minimisation. The alternatives of risk mitigation are risk reduction, risk elimination, risk insurance, risk transfer and risk acceptance. Risk controlling is another optional step that is reasonable if long-term quantitative risk management is intended. It controls the actions' effectiveness and serves as a mechanism for continuous improvement [19].

Risk management theory

The term risk originated from the early Italian term risicare, meaning ''to dare'', and, in this logic, risk is a choice rather than a fate [30]. The early entrepreneurship literature [31] argued risk as a worthy thing and taking risk was a positive act which could lead to market innovation. The greatest mutual contemporary assessment is that risk assumes the likelihood that something might be erroneous. The Stanford Encyclopedia of Philosophy [32] clarifies that risk is an undesirable happening whose consequences are negative. Individualistic reaction to risk can be determined upon by whether you perceive it is totally arbitrary or manageable. Management researchers tend to take the latter position in their view that even if risk cannot be eliminated, they can anticipate it slightly, and then reduce its impact processes may be put in place.

Though predictable tactics to risk management, e.g. decision tree methods, existed at organization case study, current study has contended against the value of classifications and lone dependence of specialists for organizational decision making to be effective. For example, Mercer *et al*., [33] argued that the risk management literature claims for a logical and purposeful strategy that assurances improved interchange of tacit knowledge. The scholars enlighten that a different field called ''post-normal risk management'', requires ''negotiation amongst persons who possess concern in the subject matter and show commitment coming up with solution. It similarly advocates that the procedure to a decision might be as vital as the facts of the decision that is finally achieved'' [34, 33].

Post-normal risk management proposes the necessity to contemplate the individuals' collaboration, as part of an organizational collective. Instead of outlining risk management as an individual perceptive procedure constrained by the individual's knowledge, post-normal risk management contends that risk ought to be debated by subject matters experts, which spread out the limits of what is acknowledged about the risk. The input of knowledge management, from this perception, is to scrutinize the form of the social relations contained by this collective setting of professionals, e.g. through social network analysis [35]. Knowledge management theory may be able to render support by investigating the implicit nature of the tacit knowledge being conveyed by these specialists and the methods employed in the social relations.

Recently researchers have suggested complexity theory as a mode to describe exactly how awareness transpires in social systems, which lacked in knowledge management theory [35]. Some scholars have recommended that complexity theory aids us comprehend the responses leading to enriched decision making in fields such as risk management [36]. Nevertheless, their opinion towards risk management is that complexity theory's key input is in creating proper borders round the cognitive processes and the expert group social setting.

Boundaries describe whatever concerns are to be incorporated, omitted or relegated in analyses (cognitive parameters) and who is to be referred to or included (social limits). Decisions on suitable limits include worth judgments imposed in an activity [37].

Complexity can be reduced through effective boundary setting by regulating the range of available options [38]. In this way, inspiring chat among appropriate specialists allied with the risk event, can extend the universal likelihoods of the social system, i.e. the risk events occurrences and their consequences termed as secondary complexity; and decrease the number of unattainable possibilities, i.e. the unknown or what Seidl [38] calls ''non-knowledge''. In this way, complexity theory from a system thinking perspective enables us comprehend the way expert arguments may rise the known range (available possibilities) and reduce the unknown size (unavailable possibilities).

Contingency Theory

A risk in construction is the presence of likely or real events which could have a negative or positive consequence on the objectives and goals of the project throughout the stages of the projects lifecycle [39]. The construction industry continually incurs risks [40]. Due to risks occurrences in construction projects, the importance of risk management is to avoid cost overruns and delays in completion of projects. There are four response strategies that can be assigned to deal with the importance of the identified risk, depending on its assessment and risk tolerance, risk appetite and risk threshold of an organisation. PMBOK®Guide [7] ascertains that risks can be avoided, transferred,

mitigated or accepted. Common exercise is that risks that may arise in construction projects are accepted and contingency funds are used to manage them which are then added into project cost estimates. According to Günhan and Arditi [41] and Touran [42], contingency funds are supposed to accommodate three risks, namely, design, construction and client's contingencies.

Design contingency is incorporated on the several phases of design completion. Unforeseen activities during the pre-construction phase of the project enables this type of contingency to be used to manage cost escalation where a problem my result due to disparity among the scope and the initial budget, therefore it can be relied upon on eliminating scope creep as a result of the development of design. Günhan & Arditi [41] additionally commended that by the time construction begins design contingency funds ought to be nullified.

Construction contingency deals with additional increment in expenses that may arise in the construction phase of the project. Contingency may also be required throughout the construction phase through other different ways, for example, cost may arise due to incremental changes brought along by material shortages or when differences between site conditions encountered and what was budgeted for arise. Moreover, the contractor may have a responsibility, for example, when overtime is needed, extra costs are essential so as to ensure that the project is completed within the proposed time frame [43].

Client's contingency deals with the increment in cost which might occur as a result of the additional previously undecided project scope. This category of contingency may not be restricted to modification in scope but may cover also the demands of the owner for project speed up, costly alternative materials used and circumstantial variations that might occur due to differences in the defined work on a project and what was visualized in the contract documents, for example, to speed up the project completion time than what was being planned for earlier.

It is important that the contingency sum ought to be correctly evaluated and projected by the construction clients since it might pose a significant influence on the project. First, when contingency is high, it discourages proper cost management, which may result to the project being aborted due to it becoming too costly. Second, when a contingency is low it means that an impracticable financial environment, whose consequences leads to substandard performance outcome, i.e. cost overrun. This study however emphases on measuring the contingency sum for the pre-tender estimation which has major effect on these two aspects: project feasibility and cost control. This mentions on how construction contingency and client's contingency are allowed for the construction phase of the project. Jackson [44] applauds that the contingency must put emphasis on how to bind these risks such as incomplete scope definition; inaccuracy of estimating methods, identified risks and unidentified risks, and those changes in scope in the design stage ought to be omitted. Complete design information is virtually accessible at this pre-tender estimate phase therefore leading to additional budget estimates which are accurate, thus leading to avoidance of cost overrun in the major issue [44].

Empirical review

Project risks and construction projects

The risk identification process is the early phase of risk management and it constitutes the organization of the whole process [45]. Failure to identify risks may result to insufficiency in the course of risks management, which may in critically impact organizational resources. This practice helps project managers to: recognise the greatest and utmost reliable input data, comprehend the process benefits, identify and recognise risks and their possible effects and deliver information for decision makers [46]. Rostami *et al*., [47] quantified that the challenge regarding the risk management practice amongst organisations generally relates to poor project managers awareness of risks and their probable effects.

Santoso *et al.*, [48] carried a questionnaire survey to examine the predominant risk elements in high-rise building construction in Jakarta, and identified site management, design issues, client interference, good communication and team work between contractors and consultants and construction equipment maintenance as most significant.

Chen *et al*., [49] debated on risks concerned with project cost, and grouped them into three categories: resources factors, management factors and parent factors. 15 most significant risks were identified, through a case study. The acceleration of material, inaccurate cost budget, supplier or sub-contractors' failure to pay and extreme interface on project management were the utmost major risks in that specific study. Additionally, Tam *et al*., [49] within an empirical research assessed safety management risks in construction projects. The main factors impacting projects safety performance were termed as: top management poor safety awareness, reluctance to input resources to safety, lack of training and careless operation. Ghosh and Jintanapakanont [50] examined the construction risk factors in large infrastructure projects in Thailand, and stated them as very significant, that is: inadequate funds; construction delay; financial failure of contractor; unclear scope of work; economic crisis; delay in resolving contractual disputes; delay in resolving disagreements; third-party delays; subcontractor failure and subcontractor shortage of sufficient number of staff.

Wiguna & Scott [51], additionally, conducted a survey on the risk factors impacting the performance of building construction in Indonesia, and concluded that: high inflation of prices; defective design; design owner change; delayed payments on contract; bad weather; unanticipated site ground condition; poor cost control; substandard construction work; delay in providing detail drawings; and problems with labor unavailability, inadequate material and equipment.

Zou *et al*., [52] surveyed projects risks from the project stakeholders and life cycle perspectives. They discovered 25 critical risks with respect to the Chinese construction culture. They established that, to identify possible risks, clients, designers and government organizations are held accountable for regulating their personal risks, and need to co-operate well with their projects stakeholders from the conceptualization stage ahead, to resolve prospective risks in time, and also that contractors and subcontractors only with vigorous construction and management knowledge, experience and capability ought to be hired to curtail construction risks and bring out safety, efficiency and quality activities.

Enshassi *et al.*, [53] examined the risk factors effect on the performance of building construction in Palestine, and recognized the most critical factors as follows: financial failure of the contractor; working in hazardous zones; regular border closure; imperfect design; delayed contract payments; division of Gaza Strip; attacks; poor communications amongst project stakes; poorly managed cash out flow; and granting the design to unqualified designers. El-Sayegh [54] furthermore researched on the critical risks in the United Arab Emirates (UAE) construction industry, and found that the following were the most crucial factors: inflation and unexpected price changes ; shortages in materials resources and supply of labor; unworkable construction schedules; inappropriate involvement of clients; and variations in design.

Anton *et al*., [55] carried a study to survey financial risks in large engineering and construction projects. The outcomes indicated that projects are prone to numerous sources of risks , internal and external, with financial risks for example, inflation, fluctuation of interest and currency exchange rates and lack of solvency denoted as the most key issues. In that grouping, contractor or sub-contractor payments were the main possible risk which triggered project to gridlock. In a research conducted towards risk factors isolation causing cost overrun in Ethiopian federal road construction projects, Turkey [56] found that, following factors as the highly crucial: scope changes; unforeseen inflation; unstable cost of manufactured materials; delays on completion time; and insufficient site exploration and inaccurate approach to problems.

Later, Karim *et al*., [57] examined the critical factors in construction projects from contractors' angle in Malaysia. The outcomes of the study on the base of 25 mutual risk factors were classified in five categories. The end result defined that the main projects risks were inadequate material resources, late provisions of material, insufficient technology, unskilled staff and cash flow issues. Grounded on complex risk factors, financial and economic factors were found to be the key causes risks on construction projects [58]. Stakeholders in projects private and public sectors, emphasized on the effect of internal and external risks, and termed construction procurement approaches as the major basis of ambiguity in projects. Tadayon *et al.*, [5], also surveyed the risk factors in large construction projects in Iran, and recognized the following as the most critical: project complexity; time constraint; experience of stakeholders engaged in the construction process; regular deviations in legal procedures; and innovative construction techniques needed.

Goh and Abdul-Rahman [59] conducted a study to examine the risk factors in the Malaysian construction industry, and identified the most critical risk: delayed payment by client; inflation and price oscillation; disparity in guidelines; tight project schedule; inadequate time to organize a tender; severe weather; nonpayment of personnel; erroneous design and ambiguity in contract provisions; political instability; and site accidents. Hwang *et al.*, [16] also surveyed the risk factors influencing the schedule performance of public housing projects in Singapore, and discovered the resulting factors as critical: effective site management; coordination amongst different parties; and convenience of laborers. Mahamid [60], similarly, explored the risk factors impacting road construction projects in Palestine and concluded the most critical risks: financial position of contractor; delayed payment by owner; poor communication amongst the construction parties; equipment inefficiency; stiff competitions in bids; and the political condition.

The latest research found that external political risks impacting on construction projects and emphasized on the revealed factors and capable factors forming political risks for construction projects [61]. The search examined the variables affecting the project system susceptibility to political risks in global construction projects. Three factors were exposed, like, attribute-based exposure, strategy-based exposure and transaction-based exposure; and three capacitated factors such as core competitive capacity, relative bargain capacity, and integrated adaptive capacity were found to be major factors of the project system exposure to political risks.

Khodeir & Mohamed [62] endlessly examined political risks that had an impact on construction projects. Seven risks in totality were identified

grounded on an inclusive assessment of their probability of happening and degree of importance. The outcome showed that effects of external risks on projects are superior in comparison to those of internal risks. However, Omran *et al*., [63] sought to address ten environmental risk factors in construction projects, and highly major factors in relation to the outcomes analysed were internal risks, i.e., delays in payments, tight schedules, and lack of sufficient qualified professional managers. These researches delivered valued statistical information for the construction industry experts to acquire an enhanced knowledge about assessment of the most fundamental risk factors and the risk identification process. Though, risks related to construction accomplishments in various stages of projects from contractors' take and life cycle have however not been thoroughly recognized in the construction industry.

Project Risks and Its Relation to Success of Construction Project

Traditionally projects are seen as successful when they meet time, budget and performance goals [64]. Though, there are variations amongst project success factors and project success criteria. Project success factors are happenings and rudiments that contributes towards the projects achievements (time, cost, scope), while project success criteria are ideals used to critic the project end results (project deliverable usability, market value, performance). The Project Management Book of Knowledge, 2004 emphasizes that project success can be measured in relation to time, cost, scope, quality and customer satisfaction [65]. This is normally referred to as the 'triple constraint'. The 4th edition of the Project Management Book of Knowledge [66] is similar, with the focus of 'performance management baselines' against project schedule, scope and cost. "Often the scope, schedule and cost will be combined into a performance baseline that is used as an overall project baseline against which integrated performance can be measured" [67].

Risk is usually perceived as disclosure to circumstances that may cause unfavorable consequence, however a project risk is an incidence that may be both positive and negative [68]. A project, by description, is a new endeavor and risks are fundamental to projects as a result of uncertainties and unknowns connected to, for example, the improvement of an original product or physical/electronic infrastructure.

Risk identification before and during the project life cycle may define the success or failure of project risk management to a great extent. Risk factors may be categorised into various groups. Zhou *et al*., [15] proposed five risk groupings in accordance to project life cycle line, whereas Wysocki [69] categorised them in line to risk takers. As one risk triggers the other risks this may cause overlap among the risk factors since the effect of outcomes may be unbearable [70]. Henceforth, efficiently risk factors identification could be a tough but essential undertaking for success of a project.

Krishnan V, Ulrich, Karl [71] in their research argued their concern towards success of construction project that similar to all other projects, projects need to have a starting point and an ending point and must similarly consist of risk management practices that permits managers to recognize and evaluate the risks linked by resource constraints and then come up with suitable outcomes that will lead towards the accomplishment of project goals. Consequently, in order for a project to be though to be successful, it is obliged to deliver within the limits of cost, quality and on time; and it is required to convey the beneficial requirements in an organization. This implies that a project that does not accomplish its aims as anticipated is termed as a failure [7].

Critical success factors

Chileshe & Kikwasi [72] outlines CSF as those comparatively minor facts of actually significant difficulties in which a specific industry would put their focus and pay attention to realize success. They signify "factors" that are "critical" to the "success" of the industry concerned in Rockart's studies. Rockart [72] expounded that focusing to the most limited resources (usually time) is crucial to project success and this can also be achieved through concentrating on the effects that actually bring out the variance amid project success and failure. Cooke-Davies [74] also referred CSFs as those factors which are essential for the project contributors to attain their project goals.

Matthias, Balve, & Spang [75] moreover asserted that CSFs are related to the particular features or environments of an industry. It will surely be different from country to country in accordance to their particular operational environment, guidelines and legal restraint. However, CSFs will often adjust to the industry's environment fluctuations that is in case there is a change in the industry in terms of company's position or as specific problematic issue or opportunity occurs for that industry the critical success factors must change. Therefore, it is necessary to recognize what CSFs are. They does not refer to measurement standard set or strategic indicators, which may be practical to all industry. However, CSFs are the specific extents of main prominence to a certain industry, at a precise point in time. They call for definite and varied situational dealings, several of which need to be evaluated by use of soft, subjective information [76].

In comparison to Herzberg's hygiene factors of motivation, incorporating success factors into account escalates the likelihood of project success, though ignoring them increases the possibility of project failure. For instance, giving consideration to construction site safety aids to protect project members

from ill health or accidents and thus avoiding excessive costs and delays [77]. Additional significant success factors are, for instance, effective communication amongst project stakeholders, proper integration of project team members, stakeholders' encouragement to participate and project spirit [78].

Assessment of project success using project success criteria ensures proper comparison between projects and acts as the foundations for prospect progresses and growth of the project management process. Moreover, it offers a significant starring role in future projects selection, as just selected projects that provide the possible utmost value to the organisation's success will be chosen [79].

Khan [80], established that success factors and success criteria can be intertwined as direct cause-effect relationships. For instance, there were such a significance relationship between the technical uncertainty and the end user satisfaction. Since the assessment of project success in various areas are to be applied in the focus of our research, project success criteria are the only taken into account. Factors that lead to project success are not considered since they are representative of levers that lead to increment of the possibility of project success and cannot be relied upon on the evaluation of the project success. However, this is exactly what brings about the variation amongst the current paper and the various suggestions to ensure that development of the process is successful [81, 80].

Project success criteria are generally concerned with projects' outcomes. They are philosophies or ideals relied in making judgment [82], in which the criterion definition fits. Time, cost and quality, identified as the Iron Triangle, are the best regularly used criteria to measure the project success or failure. However, researchers discussed that success criteria ought to be broadened as various projects differ in size, uniqueness and complexity [83]. They however suggested that extra project success criteria , which comprise of meeting specified conditions, accomplishing the purpose of the business, achieving the quality requirements, being profitable to the owner, team members involvement, stakeholders participation and contractors satisfaction, and the project users being contented with the projects final product.

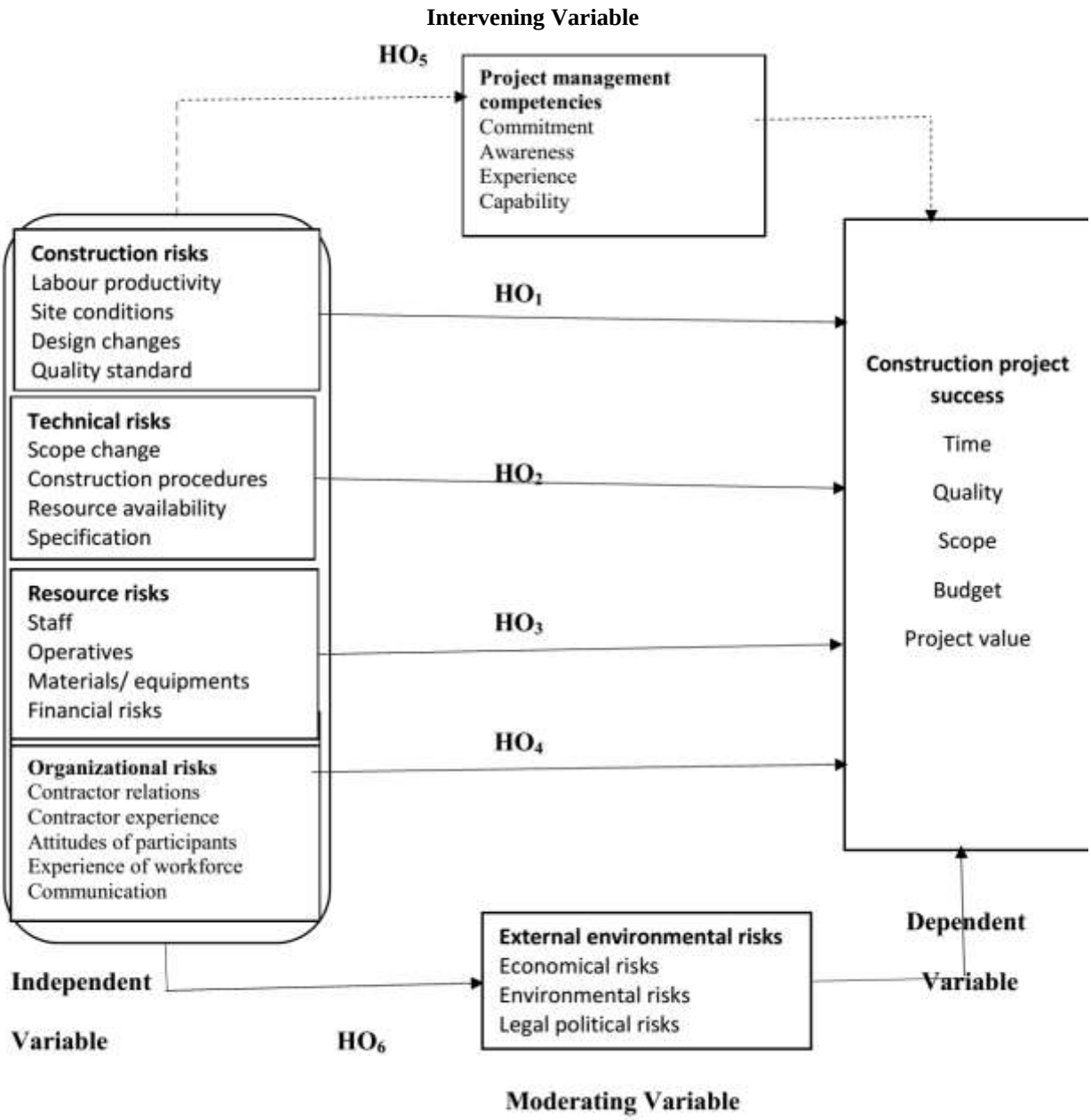
Project success criteria might vary on a certain perception. Shenhar *et al*., [84] that suggested four proportions: project proficiency, influence on customer, business success, and planning for the future. Westerveld [85] clustered the project success criteria into project outcome, time, cost, quality, client satisfaction, project personnel satisfaction, users' satisfaction, contracting partners' contentment and stakeholders' fulfilment. The project success criteria might be regularly enhanced as people would critic the success of projects in relation to their individual goals and objectives [86].

Project success criteria emphasis on project end products and they differ according to different stakeholders interests. The success criteria differ due to the perception of the project team, project sponsor, the client and the end-user of the project deliverable. Chan *et al*., [49] discussed construction project success in a different way and claimed that to accomplish construction project success, various project contributors such as end-users, client, contractor, architect and design consultants ought to be involved. Chan and Chan [87] suggested that crucial performance indicators, such as: completion on schedule; meeting the quality requirements; commercially profitable; better environmental performance; meeting users expectation/satisfaction; meeting participants' expectation; and health/safety.

However, distinctions may occur amongst success criteria, that is, the degree in which success or failure of a project may be perceived and success factor, that is, the required inputs to the management system may directly or indirectly lead to the project success [74]. The success factors could also be categorized into two key classifications, one being hard, objective, tangible and measurable whereas the other being soft, subjective, intangible and less measurable [88]. Therefore, the criteria of time, cost and quality are broadly recognised, while others such as health and safety, environmental sustainability, technical performance are factors developing significance. However, accomplishment of goals such as satisfaction, effective and efficient communication, good relationship amongst project stakeholders and lack of conflicts are put into consideration as critical indicators of project success.

PROPOSED THEORETICAL FRAMEWORK

Based on the previous sections point of view, the study suggests the following theoretical framework. The suggested theoretical framework demonstrates the link between assessments of critical risks, project management competences and success of construction projects. It also shows the role played by external environmental factors to the success of construction projects. The projected theoretical framework suggests various associations that are reflected to be crucial to understand the constructs for purposes of hypothesizing empirical study and practice in project management. The paper will consider these associations.



Source: Author, 2018

FINDINGS AND DISCUSSIONS

From the study conducted by Ali and Chike [11], the key risks included delays in payments, client variations, design variations, inaccurate cost estimates, and tight project schedules. The comparison between those three countries specified the delays in payments and project funding problems as the most critical factors that are related to cultural influences and behaviour of clients.

The results recommended a strong consistency in perception between respondents in recognizing the significance of human-related factors such as competence, commitment, communication and cooperation towards the success of a construction project. These factors being the essential components in relationship-based procurement, enhanced the requirements and feasibility of such procurement methods to construction industry.

The findings recommend that increasing designers' awareness of the important effect of applying the constructability perception can significantly support in decreasing the risks associated with the construction operation. Policy makers may contribute, furthermore, in easing the risk of incompetent technical staff and operatives' employment by regulating the movement of inexperienced and unskilled construction workforce into the State.

After a comprehensive assessment and analysis, risk factors associated to designer, contractor,

subcontractor, client and government are revealed to affect project success to some extent. This study demonstrates that though the many of the major respondents are aware of RAMP, some specialists found the practice to be informal. However, they all agreed on "improved team morale" as the most important benefits.

CONCUSSIONS AND RECOMMENDATIONS

The research falls short in addressing some resources, e.g. innovation, tacit knowledge and decision-making methods in traditional project management context. Therefore identifying these critical resources in future work and exploiting them as the means of improving project performance would enhance the success of project-based management.

The work shows important implications for improved success of projects from the use of contingency theory, project risk management theory and RDT. While the theories are well established in the framework of organization theory, there are partially applied in project management. Additionally, the model has yet being applied in the field. The hypotheses identified in this research are currently being tested using empirical investigation.

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