Risk Identification and Supply Chain Performance in Construction Industry in Kenya

Dr. Nurwin Fozia

Abstract
Globally, business organizations deal with financial risk management aspects. Other aspects of risk are not taken care of yet they can impact on the organization as a whole and even cause the financial risk. A risk assessment and analysis, in any organization, is quite important as it helps in ensuring appropriate planning for unexpected events, the organization can be ready to respond to if they arise. The aim of this research are to establish the impact of procurement risk Identification practices on supply chain management performance at ITS GOVINDA & SONS (K) LTD construction company. Specifically, the objective of the research is to critically evaluate the types of risks in supply chain at ITS GOVINDA SONS (K) LIMITED construction Company. The study was anchored on Dynamic Risk Management Theory. Descriptive survey research design was used in the study. Questionnaires were used as the main data collection instruments. Validity and reliability of the research instruments were ensued through preparation of the research instruments with experts in the department as well as piloting. Regression model was used to establish the relationship between risk identification practices and supply chain performance. From the results, the value of R squared was 0.499 which meant 49.9% of supply chain performance at ITS GOVINDA SONS (K) LIMITED Construction Company was explained by risk identification techniques. The hypothesis was rejected and thus risk identification has an effect on supply chain performance.

Keywords: *Risk, Risk Identification, Supply Chain Performance, Construction Industry.*

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Introduction
Background to the study
Risk assessment and analysis, in any organization, are quite important. They help to ensure appropriate planning for unexpected events the organization can be ready to respond if they arise. Proper risk management process should be rather proactive than reactive. Effective risk management strategies allow to identify the project's strengths, weaknesses, opportunities and threats (OECD, 2014). "Globally, most organizations deal with financial risk management aspects. This means that other aspects of risk are not taken care of yet they can impact on the organization as a whole and even cause the financial risk". The risk can be defined as the chance of something bad to happen. The future is uncertain. Then, a plan of risk management process must be established so that the company can be on the safe side against uncertainty of the future. The risk management process must involve all the activities that are combined and implemented for the performance of supply chain (Donald, 2009). "Risk to Supply Chain is any threat of an event that might disrupt normal flows of materials or stop things happening as planned". Risk Management is critical in organizations. According to a report by (OECD, 2014), "it is stated that risk management was the cause of many failures in major corporations" (Waal, 2010). "The risk management is a structured exercise combining the following activities: set objective, identify risks, assess impact and likelihood, prioritise risks, respond to risks and monitor risks".

Scope of the study
The study will be covered at ITS GOVINDA & SONS (K) LTD, a medium sized company in Nairobi specializing in construction of residential buildings for sale. The variables in the study will include risk identification practices and supply chain performance. Employees at ITS GOVINDA & SONS (K) LTD will form the target population of the study. Dockeary and Lacy (2013) stated that "Effective procurement risk management practice requires an understanding of the relationship between procurement and organizational objectives". That is why each organization must have its procurement principles, rules and procedures that must be adhered and followed.

Problem statement
Procurement includes all actions that are necessary for the acquisition, either by purchase or lease, of goods and services. According to (UNHCR, Manual Chapter 8, 2013) UNHCR Manual Chapter 8, "there are 4 principles in procurement: Best value for money, International competition, Fairness/integrity and the interest of the organization". In summary, the actions involved in procurement process are the following: Identification and specification of needs for procurement, preparing tender documents, reception of bids, evaluation of bids, preparing submission to Contract Committee for approval, notifying all bidders (congratulation letter for the selected supplier and regret letter for unsuccessful bidders providing the reasons for their failure), and preparing contract with the selected supplier.

Accenture, (2010) said "Volatility is expected to remain high within procurement's environment in the near future and it will affect supply chain performance. This implies that formal and sustained procurement risk management practices should be enacted to countermand that trend". In the construction company, the activities for procurement of goods and services will require interactions between procurement staff and other stakeholders such as: Project Manager and Engineers, Board of Directors and CEO, Finance section, Contractors/Constructors, Warehouse management staff, Human resource section and Audit section. In procurement process, Project manager and engineers will have to provide with technical drawings, specifications, bill of quantities of construction materials, plan of implementation, lead time and technical evaluation criteria that can allow to identify qualified bidders. This information will be

part of tender document. The financial estimation from the engineers is compared to the financial quotation from qualified bidders. This comparison will indicate if the financial quotation from bidders are reasonable or not. Generally, reasonable financial quotation from bidders should be 10 to 15 % more or less of the financial estimation from the engineers. If the financial quotation from the bidder is lower than 15%, attention must be paid on the implementation of the construction project. The contract manager should make sure that all the measurements are in compliance with the requirements. This would avoid receiving something that does not correspond to the norms and qualities that are expected. If the financial quotation is higher than 15% of the estimation from the engineers, the contract committee can authorize discussion to understand the reasons. If it is because the bidder has included in its offer more works than necessary or some unit's prices have been over-estimated, discussions and negotiation can be undertaken to bring the quotation to a reasonable level. Failure to provide clear and precise technical drawings, specifications, bill of quantities of construction materials and reasonable financial estimation will create misunderstanding in the construction design or unnecessary costs for the organization. This constitute a risky area. A pre-bid conference should be organized three to four weeks before the closing date of the tender. During the pre-bid conference, engineers will present on the specifications and procurement officer will present on conditions of the tender and submission of bids. The bidders will have opportunities to ask questions and clarifications. Procurement section is responsible for contract administration and should make sure that all the procurement actions adhere and strictly follow the procurement rules and principles of the organization. All the contracts and purchase orders must be approved by the appropriate committee on contracts or designated officer. Procurement risk management practices consist of all actions and activities that are conducted to minimize or bring the risks to a lower acceptable level. Each organization must have a clear procurement process that adheres procurement principles. A construction company should have due consideration for market volatilities when establishing bill of quantities for construction materials, estimated lead time to complete the project. Different ratios must be secured to cover all the liabilities (Cox, 2004). "The increasing trends towards globalization and increased competitiveness across markets have meant that most business are looking to increase efficiency by addressing workforce levels and streamlining internal operations. Businesses are now looking for at the supply chain and procurement to provide additional efficiencies". Strategically a superior supply increases business responsiveness and competitive advantage. In line with procurement efficiency, this study will focus on procurement risk identification practices that can impact on supply chain performance with emphasis on construction companies in general and especially on ITS GOVINDA SONS (K) LIMITED in Nairobi, Kenya. The main objective of the study is to critically evaluate the types of risks in supply chain at ITS GOVINDA SONS (K) LIMITED construction Company.

Importance of the study
The hope is that this study constitutes a basis for further studies in the field of procurement risk Identification practices, especially in private business entities. The research findings will, also, be aimed at benefiting the Management of ITS GOVINDA & SON (K) LTD, Policy makers and, Research and Academic Institutions. The management of ITS GOVINDA & SONS (K) LTD will find the information generated in this study useful for decision making. Some procurement risks will be identified, mitigation measures will be defined and monitoring system will be indicated. The management will have the knowledge on how best to integrate risk management practices to optimize supply chain performance. As benefits, Policy makers in private and public sectors will use the finding and recommendations of this study to enhance organization performance. They will identify the factors contributing to supply chain disruptions and they will use appropriate mitigation strategies that are proposed to decrease the threats. The researchers and academic

institutions will evaluate the findings and recommendations in order to find out the meaningful improvements in supply chain risk identification.

Research Methodology
The research methodology used was a survey. A survey can be defined as a methodology for collecting data to produce a statistical report. It is generally intended to cover large number of people or representative sample (Kothari, 2004). "Data collection is a process of collecting information from all the relevant sources to find answers to the research problem, test the hypothesis and evaluate the outcomes. Data collection methods can be divided into two categories: secondary methods of data collection and primary methods of data collection". The researcher collected primary data using questionnaires. A pilot study was undertaken to ensure validity and reliability of the tools before the research was undertaken. The target population of ITS GOVINDA SONS (K) LIMITED is 110 persons and the sample was from the management, procurement section, finance departments, Project management and Engineers, Board of Directors, contractors and warehouse management. The researcher stratified the population into departmental strata and then used purposive sampling for some areas like the CEO and members of management and use Census for the departments of Finance and Procurement. Data was analysed using inferential statistics and SPSS. They then were presented in tables and other statistical methods while testing the regression models given.
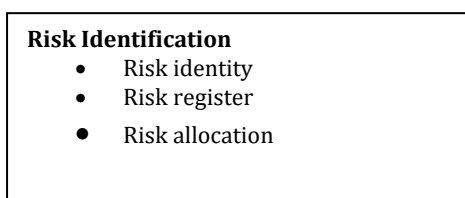
Regression Model
According to Kothari (2004), "Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of relationship between variables and for modelling the future relationship between them".

$Y = a + b1$

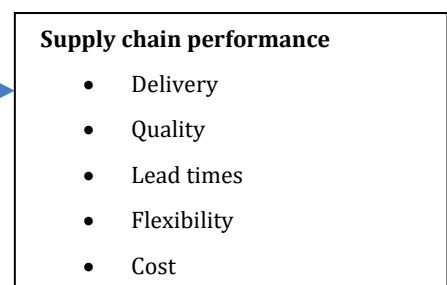Where b1 is risk identification and Y is supply Chain performance.

Conceptual Framework
Independent variable   **Dependent Variable**

Theoretical Framework
In terms of risk management theory, many authors provided their points of views. But some of these points of views appear to be focusing on the financial profit aspect from the market (Braunscheidel & Suresh, 2009). "The theory develops a continuous time, infinite horizon model of a firm which endogenously and dynamically adjusts its risk management contract which is a function of the firm's exogenous product price". According to Carlile (2004) "The model can be described by the following timeline: At time zero, the levered firm decides whether to initiate a risk management contract (guaranteeing a set of forward prices for a certain fraction of the firm's output), and chooses its maturity". The above points of view consider the price component in the sense of benefit and believe that the risk management process should be conducted if necessary. The conditions are observed on the market and decision can be taken for the risk management process if anything that may affect the profit is suspected. In opposition to the above ideas, this study supports that the risk management process should be rather proactive

than reactive because the risks are linked to the objectives and can appear at any time of the project implementation. According to Waal (2010) "The risk management is a structured exercise combining the following activities: set objective, identify risks, asses impact and likelihood, prioritise risks, respond to risks and monitor risks". The objectives of the construction company include building a compound of 100 residential apartments for sale. The time frame is 24 months. Many activities will be combined and implemented in order to reach the objectives and these activities are inherently risky. Procurement is a typical activity, which can affect negatively the performance of the supply chain if possible, risks are not identified and taken care of. Before the procurement activities start, the possible risks must be identified, list of risks analysed and appropriate prevention measures and mitigation actions defined for each risk. All the workers of an organization should actively be involved in risk management.

Literature review
The strategy of the supply chain involves conception of actions and guidelines for an organization to gain as much as possible over the long-term perspective. In terms of procurement, high price and limitation of local market can be a risky area. As prevention measure and mitigation actions, preparing a global purchasing plan for a project, floating open tenders for competitive bidding and establishing long term frame agreements for frequently purchased items will bring the suppliers to be more committed and offer competitive prices. The suppliers will find more interest and will engage consequently. If they have to import from abroad, they will do it. Sourcing option from the international market can be explored and cost benefits analysis conducted in comparison with the local suppliers. But, if the procurement process is initiated when items are required, on ad-hoc basis, the quantity of items may not be important and the suppliers may not find interest to engage and offer competitive price. Barkley (2004) argues that "Real-world experience teaches us that risk is, in truth, an inseparable aspect of the whole project life cycle and its irrationality and interpersonal dynamic. In a way, risk events are a result of bad planning. In this sense, risk can be seen as a continuous series of individual and collective decisions in planning and managing a project". Risk identification includes an assessment of the incentives, pressures, and opportunities to commit an act that will put the normal running of the project at risks. Risks can come from several sources. Donald (2009) suggests that "With this almost limitless variety of risks, we can identify two basic kinds of risk to a supply chain – external and internal risks". Basically, this study supports that the risks are either internal or external to the supply chain. The external risks come from outside the supply chain. For the construction industry that this dissertation focuses on, the external risks include earthquake, damage on roads, railways and bridges, natural calamity, wars, outbreak of disease e.g. COVID-19, serious price fluctuation on local and international market after award of contract, issues (incapacity to deliver on time) with suppliers, shortage of raw materials, financial irregularity, conflict situation around the ownership of the land and legal issues related to the authorization or permit for construction. Assessment missions on the site of construction, appropriate market survey and research on legal issues can help to identify external risks for the construction company. The internal risks are those that exist within the supply chain. Although difficult to be detected, they can, anyway, be controlled by the mangers. In construction industry the internal risks include misunderstanding in the conception of the construction project (unclear specifications and bill of quantities for construction materials), contract administration process (procurement process), contract management process (different phases of implementation), environmental risks (transport and delivery), devotion of construction materials, conflict of interest situation for staff of the organization, poor forecasts and lack of funding. Renault & Agumba (2016) argue that "Risk identification is a vital part of the risk management process as risks that are not identified, and thus not responded to, will have an impact on the project". Once risks identified, a list should be established and an assessment should be undertaken in order to determine the likelihood and impact. According to Waters (2011) "There are

many types of quantitative analyses for risk, but they are all based on two factors: The likelihood of a risky event occurring; and the consequences when the event does occur". (UNHCR, 2016) Enterprise risk management defines the likelihood and impact as per below:
"The Likelihood refers to the possibility of a risk potential occurring measured in qualitative values such as low, medium, high or very high".

Very low	Barely likely to occur.
Low	Very unlikely in the next one year but possible in the longer term.
Medium	Possible in the next one year, and/or reasonably likely in the longer term.
High	Likely in the next year and/or very likely in the longer term.
Very high	Very likely in the next year and/or almost certain in the longer term.

"The impact of risk is an estimation of the potential losses associated with an identified risk".

Insignificant	Main objectives can be achieved with small obstacles to overcome.
Minor	Main objectives can be achieved with manageable obstacles possibly taking up some time and resources
Moderate	Main objectives can be achieved, but not as well as planned and/or extra time and resources will be required.
Major	The achievement of main objectives will be hindered, considerable extra time and resources will be required, and/or the operation, Headquarters unit or organization as a whole will be negatively impacted.
Disastrous	Main objectives will not be achieved, effectiveness will be substantially disrupted, and/or the standing and position of operation, Headquarters unit or the organization could be seriously undermined

Sameh (2014) states that "Once project risks are identified, the next stage is to analyse and prioritise them to guide risk management action". Prioritisation is done by comparing individual risks (internal or external) and ranking by likelihood and impact. According to Nyaoga (2016) "Supply chain performance is defined as the entire chain's ability to meet end-customer needs through product availability and responsive, on-time delivery". Goldstein, Schroeder & Mayer (2018) stated that "While there are many metrics for measuring supply chain performance, examples of specific measures include Delivery, Quality, Flexibility, Time and Cost". The delivery performance is an indication of the extent up to which a company can supply products and services that meet the customer's expectation. If residential apartments are forecasted to be ready at a given time, the company should make all the efforts to meet that delivery time. Failures to meet the time can make customers to change their mind, especially if they realise that the completion and final delivery may take more time than expected. In supply chain, the product quality starts by inspecting the raw materials so that they meet the required specification and customer satisfaction. This impacts directly the product quality and the overall profitability of a company. In construction industry for residential apartments, the materials to be used must be communicated and the quality is specified. If customers don't see the quality that was expected, they may not buy the apartments. In supply chain, the flexibility refers to the speed in which the supply chain responds to changes in demand and the business environment. During the implementation of construction project, a supplier may fail to deliver materials on timely basis. The supply chain should plan, in advance, multiple sourcing option in order to deal with such kind of business environment. In supply chain management, the lead time represents the time it takes to deliver goods or service from the time the supplier is aware of an order from a customer. However, it is important to consider, also, the time it takes to get paid for the product once it is sold because the company must get cash from sales so that the money can be used to make and sell more products. In this case, the lead time for a construction company should be from the time the construction starts to the time the customer buying the house pays the money. The cost refers to the amount of money spent to produce a good. This may include cost for materials, labour and overhead, and the total amount to be divided by the number of units that have been produced.

Research hypothesis
The research hypothesis are tentative answers to the research question. They are normally derived from the research objectives. Therefore, the research hypotheses formulated from the research objectives are as follows:

H01: *There is no significant risks in supply chain management at ITS GOVINDA SONS (K) LIMITED construction Company.*

Research design
The research design states the technique and structure of looking for specific information or knowledge from a group of individuals. It aims at addressing the research problems in an effective manner. According to (Selltiz, Marie, Morton & Cook, 1959) "A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure". The research design facilitates the different operations and make the research as efficient as possible. This study selected quantitative methodology using survey design. Survey is a research method which consists of collecting data from a determined group of respondents. It can be administered remotely via online, mobile device, e-mail, telephone calls. The aim of the survey design is to collect information that provides answers to the scope of the study. According to Saunders, Lewis, & Thornhill, (2012) tey noted that "It is appropriate when the researcher wishes to provide an accurate representation of persons, events or situations and make inferences about the target population".

Target Population
For this study, the target population will be all the 110 employees of ITS GOVINGA & SONS (K) LTD. The employees are spread in thirteen departments as shown below.

Target Population	
Department	**Target Population**
Board of Directors	07
Chief Executive Officer (CEO)	01
Project Manager/Architecture	01
Engineers	05
Contractors (constructors)	60
Supply Chain, Procurement and Logistics	05
Warehouse Management	10
Finance officers	03
Auditors	02
ICT officers	03
Human resource	03
Customer care	05
Sales and marketing	05
Total	**110**

Source: ITS GOVINDA & SONS (K) LTD, 2021

Sampling Frame
The aims of this study include establishment of the impact of procurement risk identification practices on supply chain performance of the company. Considering the aim, the researcher does not find necessary to involve all the 13 departments of the company. In this case, the matter was the sampling method to choose in order to receive information in line with the purpose of the study. The non-probability sampling used targets the elements that are suitable for the purpose of the study. According to Ilker, Musa, Alkassim, (2016) "The purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses". Taking into consideration the suitability for the purpose of the study, the research used purposive sampling of departments that interact in the procurement process and that can have serious impact on the supply chain performance. According the researcher own

judgement, the following 8 functional departments are suitable for the purpose of the study: Board of Directors, CEO, Project Manager/Architecture, Engineers, Supply Chain, Warehouse Management, Finance and Human resource. The total number of staff in the sample will be 35.

Sample Size
The sample size is a representative of the large population". Cooper and Schindler (2014) advise that "the greater the desired precision of the estimate, the larger the sample should be". This means that the sample size has great effect on statistical results. However, the target population for the present study is small. Then, the research employed the census method by selecting all the employees from the departments that are suitable for the purpose of the study. The census method is suitable for this study because the population is small. Mugenda & Mugenda (2003) asserts that "When the study population is not large, sampling techniques are not necessarily applied as this could increase sampling error". The table below shows the sample size of the study.

Sample Population

Department	Sample Population
Board of Directors	07
Chief Executive Officer (CEO)	01
Project Manager/Architecture	01
Engineers	05
Supply Chain, Procurement and Logistics	05
Warehouse Management	10
Finance officers	03
Human resource	03
Total	**35**

Data collection instruments
Questionnaires were used to collect the data using the drop and pick method.
Validity test
For the purpose of this study, content validity was ascertained through the judgment of the experts from the department. This type of validity ensured that the test items assess the knowledge required for assessing effect of procurement risk management practices on supply chain management performance. According to Creswell (1994) content validity indicates how well the items are thought to cover the domain of each scale and how easily they are understood by the respondent. Thereafter comments from the experts were used to improve the instruments. A test-retest method was further used where the questionnaire were administered twice in an interval of two days. Areas identified as potential sources of problems in the instruments were improved accordingly before the final administration of the instruments.
Reliability statistics
Cronbach Alpha coefficient value was derived from the pilot data and the results were as shown below.
Risk Identification

Reliability Statistics	
Cronbach's Alpha	N of Items
.780	4

Supply Chain Management

Reliability Statistics	
Cronbach's Alpha	N of Items
.791	5

The research instrument is reliable since all values of Cronbach Alpha coefficient are above 0.7 as recommended in social sciences (Cronbach, 1959).

Data analysis, presentation and interpretation.
The study used structured questionnaires to capture quantitative data from the respondents. A total of 35 questionnaires were issued to the respondents out of which all the questionnaires were correctly filled and returned on time. This translates to 100% of which was considered adequate. Summary of the results are presented below.

Questionnaire Return Rate

Department	Issued	Returned	Percent
Board of Directors	7	20.0	20.0
Chief Executive Officer	1	2.9	2.9
Project Manager	1	2.9	2.9
Engineers	5	14.3	14.3
Supply chain, Procurement and logistics	5	14.3	14.3
Ware house management	10	28.6	28.6
Finance officers	3	8.6	8.6
Human Resource	3	8.6	8.6
Total	**35**	**100.0**	**100.0**

The study sampled questionnaires from different departments. There were 7 board of directors who participated in the study, 1 CEO, 1 project manager, 5 engineers, 5 supply chain and logistics employees, 10 warehouse employees, 3 employees from finance department and 3 human resource employees. From the findings, all the questionnaires were correctly filled and returned. This imply that the response rate in this study was high. This could be attributed to the fact that the study was a case of ITS GOVINDA SONS (K) LIMITED construction Company. The study was done in one company where respondents were in one place as opposite to a situation where respondents are spread in different companies. In the words of Kothari (2004), the response rate of at least 50 % is deemed good and hence fit for further analysis.

Distribution of Respondents by Gender
The study set out to establish the gender of respondents.

Distribution of Respondents by Gender

Gender	Frequency	Percent	Cumulative Percent
Male	24	68.6	68.6
Female	11	31.4	100.0
Total	**35**	**100.0**	

The results in Table above shows that out of 35 participants in this study, 24 (68.6%) were male while 11 (31.4%) were female. The number of male respondents was higher than female. A study ought to avoid biasness in terms of gender. According to the constitution of Kenya, it recommends 50% either gender. Therefore, the response in this study the response went against the recommended 50% either gender as stipulated in the constitution of Kenya (2010) on gender parity. It is worthy to note that the number of female respondents were fewer as compared to male respondents. This might explain why there was a variation with regards to gender. Despite that, the representation is statistically adequate for further analysis. The findings are therefore not gender biased.

Distribution of Respondents by Level of Education
Respondents were asked to indicate their level of education. We had four levels of education namely certificate, diploma, degree and masters. The results were as summarized in Table below.

Distribution of Respondents by Qualification

Qualification	Frequency	Percent
Certificate	1	2.9
Diploma	10	28.6
Degree	17	48.6
Masters	7	20.0
Total	**35**	**100.0**

The results in Table above shows that out of 35 respondents, 2.9 % had certificate, 28.6 % had diploma, 48.6 % had degree while 20 % had masters. From the findings at least 24 respondents had degree qualification and above. All the respondents were able to read and respond to the questionnaires. The information sought regarding level of education was important in this study. The study focussed on procurement risk management practices on supply chain performance with emphasis on construction companies in general and especially in ITS GOVINDA SONS (K) LIMITED in Nairobi, Kenya. Therefore, understanding the risk management exercise was critical as far as Waal (2010) is concerned. This was supported by Dockeary, and Lacy., (2013) who noted that risk management process needs stakeholders to understand the association between procurement and organization goals.

Distribution of Respondents by age bracket
The study requested respondents to indicate their age bracket in years. The results were as presented in the Table below.

Distribution of Respondents by Age bracket in Years

Age Bracket	Frequency	Percent	Cumulative Percent
21 to 30 years	10	28.6	28.6
31 to 40 years	14	40.0	68.6
41 to 50 years	6	17.1	85.7
Above 50 years	5	14.3	100.0
Total	**35**	**100.0**	

From the results in Table above, 10 (28.6%) respondents were 21 years to 30 years, 14 (40%) were 31 to 40 years, 6 (17.1%) were 41 years to 50 years while the remaining 5 (14.3%) were above 50 years. Majority of the respondents were above 30 years.

Test of Statistical Assumption Analysis of Using Regression Model
Diagnostic tests are critical in establishing the relationship that exists among the variables when using Likert scale research instruments like a questionnaire. In this study various normality and multicollinearity tests were undertaken to qualify the use of regression modelling.

Normality Test
Regression modelling assumes a linear relationship between variables. Therefore, for the study to use regression, it was important to establish whether there was a normal distribution of the variables. Factor analysis which is an exploratory tool was used to help the study make decisions on whether the independent variables under study explained the dependent variable the study used Kaiser-Meyer-Olkin (KMO) to measure sampling normalcy and adequacy. The results were as shown in Table below.

Normality and Adequacy Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.891
Bartlett's Test of Sphericity	Approx. Chi-Square	458.3
	Df	4
	Sig.	0.000

Source: field data, 2021

The Kaiser-Meyer-Olkin (KMO) measure of sampling ranges between 0 and 1. Kaisen (1974) recommends 0.5 as minimum (barely accepted), values from 0.7 to 0.8 are acceptable and values above 0.9 are excellent. From the results, Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.891 which was acceptable and significant given that the p value was in parenthesis, thus indicating the results of the sample size were adequate and that data was normally distributed.

Multi-Collinearity Test of Independent Variables

The variance inflation values needed to range between 1- 10 to ensure that multi-collinearity does not exist. Table below shows the results of procurement risk management practices on supply chain management performance.

Multi-Collinearity Test

Procurement risk management Practices	Variance Inflation Factor (VIF)
Risk Identification	8.322
a. Dependent Variable: Supply Chain management Performance	

From the results, risk identification had a VIF value 8.322, from the results, variance inflation values were ranging between 1- 10, hence the data was not suffering from multi-collinearity and was therefore suitable for further regression modelling and interrogation.

Descriptive Statistics of Risk Identification Techniques

Respondents were requested to score by responding on statements regarding risk identification. The scores were put on a five point Likert scale where; SA= Strongly Agree (5), A= Agree (4), N=Neutral (3), D= Disagree (D) and SD= Strongly Disagree (1). Summary of descriptive statistics was as presented in the table below : Success of risk identification should be assigned to an individual in the organization to ensure its success. In line with Renault, & Agumba (2016), risks can either be internal or external. Internal risks usually come from within the employees of the organization who are relied upon to implement and design systems, procedures and policies aimed at achieving the objectives of the organization. The problem is normally arises from poor selection, training and management of human resources. Therefore, identification of risks in the management process is important because they have an impact on the project. UNHCR (2016) gave an outline of risk identification which was captured in the descriptive analysis in this chapter.

Risk Identification Techniques

Statements	Minimum	Maximum	Mean	Std. Deviation
In our organization risks management exercise is organized at the beginning of each construction project	3.00	5.00	4.6000	.60391
In our organization, we have a risk register that documents all risks that may occur in a project	2.00	5.00	4.3714	.84316
In our organization, risks are classified by order of priority	3.00	5.00	4.5429	.56061
In our organization, all employees are taken through risk management process	2.00	5.00	3.6000	1.00587

Results in Table above show all mean and standard deviation of risk identification. The first statement; In our organization risks management exercise is organized at the beginning of each construction project had a mean of 4.6. On the Likert scale this value is between 4 which was agree and 5 which represent strongly agree. The respondents are therefore in agreement that risk management exercise is organized at the beginning of the construction project. The standard deviation 0.60391 was less than one, which implied the deviation across the respondents, it confirms the agreement of the statement. In the second statement; In our organization, we have a risk register that documents all risks that may occur in a project, the mean was 4.3714, with standard deviation 0.84316. The mean was between 4 and 5 on the Likert scale. This implies that respondents are in agreement there exist a register recording all the risks that may occur in a project. Statement three: In our organization, risks are classified by order of priority, the mean was 4.5429 with standard deviation of 0.56061. The response confirms respondents are in agreement risks are classified by order of priority. Statement four; In our organization, all employees are taken through risk management process had a mean of 3.6 with standard deviation of 1.00587. On the Likert scale, the mean was between 3 and 4. Therefore respondents were uncertain whether all employees are taken through risk management process. In addition, given that the standard deviation was above 1, it implied there exist doubt amongst employees whether they are taken through risk management process. There is need for employees to be taken through risk management process.

Risks Identification Techniques and Supply Chain Performance
The first objective of the study was to evaluate the risk identification techniques in supply chain at ITS GOVINDA SONS (K) LIMITED construction Company.
The study set out the following null hypothesis;
H_{01}: There are no significant risks identification techniques in supply chain management at ITS GOVINDA SONS (K) LIMITED construction Company.

Results show that risks exist at its GOVINDA SONS (K) LIMITED construction Company. From the findings, the risks management exercise is organized at the beginning of each construction project. The company has a risk register that documents all risks that may occur in a project. The company classify risks by order of priority. However, there is need to take through all employees the process of risk management. The study further used regression model to establish whether risk identification techniques affect supply chain performance. The relationship between risk identification and supply chain performance followed the following form:
$Y = \beta_0 + \beta_1 X_1 + e$
Where
Y = Supply chain management performance
β_0 = Constant
X_1 = risk identification
β_1= Beta coefficient
e = the error term
The study used simple regression at 95% confidence level and 0.05 significance ($p \leq 0.05$) to establish the relationship between two variables.
The table below shows the model summary between risk identification and supply chain performance.

Model Summary of Risk Identification

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.707a	.499	.463	2.52273
a. Predictors: (Constant), Supply chain performance				

From the results in Table above, the value of R squared was 0.499 (r^2=0.499). This implied that at 95% confidence level, 49.9% of supply chain performance at ITS GOVINDA SONS (K) LIMITED Construction Company was explained by risk identification techniques.

The table below shows the ANOVA test between risk identification and supply chain performance.

ANOVA statistic of Risk Identification

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	9.082	1	9.082	41.427	.001[b]
	Residual	203.654	32	6.364		
	Total	212.735	33			
a. Dependent Variable: Risk Identification						
b. Predictors: (Constant), Supply chain performance						

P values are in parentheses.

From the table above, ANOVA statistic had an F-test value 41.427 at p=0.001. This implied that the variance in risk identification was similar to the variance in supply chain performance. This therefore means risk identification explained movement in supply chain performance.

The t-test results were presented in Table below.

t-Test Results of Risk Identification

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.443	.525		3.230	.000
	SCP	.749	.741	.707	7.195	.001
a. Dependent Variable: R1						

Key: SCP=Supply chain performance, RI=Risk Identification

P values are in parentheses.

Results in the table above show t-value increasing from 3.23, p=0.000 to 7.195, p=0.001. The variation in t-value was 3.965. The results therefore meant risk identification explained 3.965 unit change in supply chain performance. The relationship between risk identification and supply chain performance was put in a regression form;

$Y = 7.443 + 707X_1 + e$

Where, Y is Supply chain management performance, X_1 is risk identification and e is the error term. The null hypothesis was therefore rejected. The study concluded that there are risk identification techniques its GOVINDA SONS (K) LIMITED Construction Company. The findings of the study are in agreement with the words of Waters (2011) who noted that once risks identified, a list should be established and an assessment should be undertaken in order to determine the likelihood and impact. We have different types of quantitative analysis for risk. It's upon the organization to narrow them down into two factors namely probability of occurrence and consequences. This therefore imply having prior information on the severity of the risk will put the company in the best position of handling them.

Summary of findings

From the findings, the risks management exercise is organized at the beginning of each construction project. The company has a risk register that documents all risks that may occur in a project. The company classify risks by order of priority. However, there is need to take through all employees the process of risk management. The study set out the following null hypothesis;

H₀₁: *There are no significant risks identification techniques in supply chain management at ITS GOVINDA SONS (K) LIMITED construction Company.*
From the results the value of R squared was 0.499 which meant 49.9% of supply chain performance at ITS GOVINDA SONS (K) LIMITED Construction Company was explained by risk identification techniques. The null hypothesis was rejected.

Conclusion
The study concluded there are risk identification techniques at ITS GOVINDA SONS (K) LIMITED Construction Company. Secondly, different departments use several risk mitigation strategies. In addition, there are risk monitoring practices at ITS GOVINDA SONS (K) LIMITED Construction Company. Organization factors have a statistically significant impact on supply chain performance at ITS GOVINDA SONS (K) LIMITED Construction Company. The analysis of the likelihood and the impact of the risks related to our construction company is established as follow:

Risk identification at ITS GOVINDA SONS (K) LIMITED construction Company, all the employees are not taken through risk management. The likelihood is very low and the impact is insignificant. Supplier's code of conduct with accent on gift and conflict of interest policies established and communicated to suppliers. The likelihood is very low and the impact is insignificant. Non electronic transfer of funds as preferred payment method. The likelihood is very low and the impact is insignificant.

This conclusion is supported by the work of Waters, (2011), who stated that all types of quantitative analysis are based on the likelihood of a risky even and the impact when it occurs. In reference to the four "T" process (Tolerate, Treat, Transfer and Terminate) of Harrera (2013), as preferred way to determine the risk control strategy, the decision is to treat the risks that have been identified. Treating the risk involves taking preventive measures and mitigation actions against the risks. Therefore, the warning sign, prevention measures/mitigation actions include the following:

Risk1.   All the employees are not taken through risk management.
Warning signs: Behaviors of employees with no consideration for the related risk, several ad-hoc requests and activities without considering the plan of implementation
Prevention measure/mitigation actions: Taking all the staff through risk management process. Sharing risk register with all the employees. Risk management reminder during meetings.
Risk 2.   Supplier's code of conduct with accent on gift and conflict of interest policies established and communicated to suppliers.
Warning signs: Poor or no quality check of delivered goods, lack of supporting documents during delivery of good and services, accepting goods of low quality, employees favoring a supplier for awarding contract, known or rumored personal relationship between personnel and suppliers.
Prevention measures/mitigations actions: Establishing and disseminating the supplier's code of conduct at each opportunity of procurement, organizing vendors training for suppliers on the contract awarding and management process, insisting on zero tolerance policy.
Risk 3.   Electronic transfer of funds as preferred payment method. The likelihood is very low and the impact is insignificant.

Warning signs   Several payment requests through cash or check, beneficiaries that are not recorded in the payroll database, missing records and payment made without making reference to any contract or project

Prevention measures/mitigation actions: Electronic funds transfers as preferred method of payment. Ban on cash payment, systematic verification of all documentation for payment and limitation of payment through check

Recommendations

Risk identification, risk mitigation strategies and risk monitoring practices carried out at ITS GOVINDA SONS (K) LIMITED Construction Company is encouraged and should be enhanced. All employees at ITS GOVINDA SONS (K) LIMITED Construction Company need to be taken through risk management process. Additionally, there is need to use electronic funds transfer as the preferred way of making payment at ITS GOVINDA SONS (K) LIMITED Construction Company. Moreover, there is management involvement in procurement procedures at ITS GOVINDA SONS (K) LIMITED Construction Company and it should be encouraged.

Suggestions for further research

The study was carried out at ITS GOVINDA SONS (K) LIMITED construction company. The findings and conclusion may be limited to the company. Further studies are encouraged to cover at the same time more construction companies, in the private and public sectors in order to compare the findings and make general conclusion recommendations for construction companies, in terms of procurement risk management process and practices. Further studies are encouraged to cover both public and private companies in Kenya and compare the findings with the current research. The research was restricted to construction sector. Further studies of procurement risk management process are encouraged to have other sectors and compare the findings. Further studies are encouraged to establish the moderating influence of resource allocation on the relationship between risk management practices and supply chain performance.

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