

## Investigating the Relationship Between Operational Risk Management Practices and Construction Project Delivery Performance in Arab Construction Company

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### ABSTRACT

The study was on relationship between operational risk management practices and construction project delivery performance in Arab Construction Company, Abuja Nigeria. The study aimed to assess the relationship of risk avoidance and return on the investment on project delivery, to identify the relationship of risk transfer to the third party and the delivery on the organization's market share, to ascertain the extent mitigation affect the utilization of organization's plants capacity. The study had a population's size of 1150, out of which a sample size of 297 was utilized using Taro Yamane formula. Instrument used for data collection was primarily questionnaire. 260 staff returned the questionnaire and correctly filled. The survey method was adopted for the study. Three hypotheses were formulated and tested with the aid Chi-square ( $X^2$ ) statistical tool for hypotheses one and three, and Z-test for hypothesis two with the aid of (SPSS). The result revealed that, risk avoidance has positive relationship on return on investment on project delivery.  $\chi^2(95,n=297) = 10.337, p<0.5$ . Risk transfer to the third party has positive relationship on organization's market share.  $\chi^2(95,n=297) = 11.503, p<0.5$  and Mitigation has strong relationship with utilization of organization's plant capacity.  $\chi^2(95,n=297) = 15.772, p<0.5$ . The study concludes that operational risk management practice has positive relationship with construction project delivery performance, and if not handled properly can result in poor staff performance, ultimately it will affect output. The study recommends that the management should acknowledge the presence of operational risk and work towards reducing their negative impacts on activities within the system.

**Keywords:** Risk management, Project delivery, Performance.

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## INTRODUCTION

Today, industries have become more future focused and conscious of applying risk analytical techniques in projects. Risk management has every now and then been discussed across industries. In the construction industry, risk management is not often used or applied [1]. Risk is associated with any project regardless of the industry, and therefore, risk management should be of interest to any project manager. As the industry differs so is the risk involved especially in the construction industry [2]. However, so many project managers have not realized the necessity of including risk management in the process of delivering the project [3]. [4], writes that the target of any project is to be successful which can be achieved through risk management. However, it should be noted that risk management is not an instrument or tool which ensures but rather a tool that facilitates the probability of achieving success. Risk management is therefore a proactive rather than a reactive concept. Economic crisis has had an adverse impact on Nigeria's economy, construction industry inclusive. The construction sector, one of the engines of economic growth in Nigeria over the last decade, is now facing serious challenges such as abandoned projects, cost overruns and companies closures among others. These have changed the clients and construction companies

behaviour. This increased pressure to ensure safety delivery of project at improved quality, targeted costs without being a victim of unexpected failure calls for effective and constant risk management [2].

Some of the risks associated with construction are poor quality of work, premature failure of the facility, a lack of safety, poor or incorrect design, and financial risks [3]. [5] have identified risk management as an important tool in dealing with and overcoming some of the above risks on a construction project. [6], informs that risk management plays a significant role in the decision making process. It can affect productivity, performance, quality and the budget on a construction project. The purpose of risk management is to ensure that all parties to a construction project understand the risks specific to the project and work out patterns on how these risks should be managed for effective project delivery.

### Statement of the Problem

Operational risk management is seen as integral decision making process in effectively managing construction projects. It affords project stakeholders hands on knowledge and tools to manage foreseeable and unforeseeable events which occur in project delivery. It offers the maximizing the probability and

consequence of positive events and minimizing the probability and consequence of adverse events to project objectives.

A lack of proper risk management often leads to project delays, cost overruns, and may also result in project failure. The skills gap of many construction workers is seen across the country in poor quality construction works, poor workmanship, structural failures and avoidable fires and injuries. The construction industry in Nigeria is faced with a myriad of technical, non-technical and unique project management challenges. The non-technical challenges include lack of know-how, skills and experience needed to deliver projects.

Construction processes are to a large extent unique and complex giving rise to numerous challenges or risks; risks that ultimately determine the extent to which project requirements are met. Managing risks, which are inevitably part of any construction management process, is therefore essential in successful project delivery. Project Managers, Clients, Contractors, and Quantity surveyors rank 'Joint evaluation by key project participants' as their most frequently used risk analysis practice.

### **Objective of the Study**

The general objective of the study was to evaluate the relationship between

operational risk management practices and construction project delivery performance in Arab Construction Company Abuja, Nigeria. The specific objectives were to:

- i. Assess the nature relationship between risk avoidance strategy and return on investment in Arab Construction Company Abuja, Nigeria.
- ii. Ascertain the relationship between risk transfer to the third party and the market share in Arab Construction Company Abuja, Nigeria.
- iii. Examine the extent of relationship between mitigation and utilization of plant capacity in Arab Construction Company Abuja, Nigeria.

### **Research Questions**

- i. What is the nature of relationship between of risk avoidance and return on investment in Arab Construction Company Abuja, Nigeria?
- ii. What is the relationship between risk transfer to the third party and the market share in Arab Construction Company Abuja, Nigeria?
- iii. What is the extent of relationship between mitigation and utilization of plant capacity in Arab

Construction Company Abuja, Nigeria?

### **Research Hypotheses**

The following hypotheses guided the study

- i. Risk avoidance has positive relationship with return on investment in Arab Construction Company Abuja, Nigeria.
- ii. Risk transfer to the third party has positive relationship with market share in Arab Construction Company Abuja, Nigeria.
- iii. Risk Mitigation to a great extent has positive relationship with the utilization of plant capacity in Arab Construction Company Abuja, Nigeria.

### **REVIEW OF RELATED LITERATURE**

Risk management spans across all project phases; planning, design, construction, operation and maintenance [8]. This “risk management” was asserted by [7] as the entire set of activities and measures that are aimed at dealing with any possible risks, in order to maintain control over a project; and [9] defines risk management as the systematic process of identifying, analyzing and responding to risk. Therefore, the risk management continues to be a major feature in an attempt to deal effectively with uncertainty and unexpected events and to achieve project success. Construction projects are always

unique and risks raise from a number of the different sources. Construction projects are inherently complex and dynamic, and involving multiple feedback processes. A lot of participants-individuals and organizations are actively involved in the construction project, and they interests may be positively or negatively affected as a result of the project execution or project completion.

### **Concept of Construction Project Delivery**

Project Delivery is the process by which a project is contracted for construction, such as design-build, design bid build, design build operate. Project Delivery is the process by which all of the procedures and components of designing and building a project are organized and put together in an agreement that results in a completed project, [10]. In addition to choosing a delivery system for a project, the owner must decide what type of contract to use. A contract is simply an agreement between two or more entities in which they agree to provide a specific task in exchange for something in return. The contract type basically is the format on how the owner pays for the services of the contractor.

### **Concept of Performance**

Performance is a multi-dimensional concept. On the most basic level, [5], distinguish between task and contextual performance. Task performance refers to

an individual's proficiency with which he or she performs activities which contribute to the organization's 'technical core'. This contribution can be both direct (e.g., in the case of production workers), or indirect (e.g., in the case of managers or staff personnel).

Contextual performance refers to activities which do not contribute to the technical core but which support the organizational, social, and psychological environment in which organizational goals are pursued. Contextual performance includes not only behaviors such as helping coworkers or being a reliable member of the organization, but also making suggestions about how to improve work procedures.

### **Lean Construction Theory**

Lean construction has been evolving over the last 20 years with theoretical foundations identified in [6] report. In 2004, Koskela and the second author challenged the traditional project management community by declaring the underlying theory of project management obsolete. This exposed the poverty of the theory espoused by the Project Management Institute and called for a reform, [7]. Thus the theoretical development of lean construction metamorphosed into a theory of the project (TFV) and a theory of management-planning, execution and control. This usefulness of this model is

its ability to assist the construction industry in delivering projects and resolving conflicts arising from novel ideas from outside the industry. Lean Construction is an innovation that was provoked by the inability of traditional practice to solve a set of common and repeating problems on projects. The journey of Lean Construction is still incomplete. Two developing lines of thinking, "complexity" exemplified in the Cynefin model of sense making and Dekker in relation to safety, and theories of collaboration and fairness proposed by Bowles and others may reshape, alter or expand the conceptual foundations of Lean Construction.

Lean Construction theory explains the inadequacies of traditional practice; we fail to capitalize on the altruistic and cooperative nature of human beings. Here he see the connection between Complexity, Cynefin and Collaboration and how they inform the one another. The Cynefin framework helps us make sense of the environment created by humans with their own prejudices. In order to make sense and take advantage of this phenomenon, theory building must be based on the foundations of human nature. Owners want their facilities constructed and delivered hassle free within the agreed parameters. In order to achieve this they need the cooperation of various professionals who translate the owner's desires into a form

communicable and understood by the contractors who physically construct these facilities.

Lean Construction provides an integrated approach where that cooperation is enhanced; there is no “them vs us” in the single purpose for which the team has been established. Success requires that team members benefit from the project as a team rather than as individual companies. Bowles demonstrates that there are social costs associated with a behavior that threatens the livelihood of others; the team punishes individuals who take advantage of the situation as Free Riders working for their own benefit at the expense of others. This source and power of this cooperative nature needs to be better understood in the context of contracts and informed by the Cynefin framework.

### **Empirical Review**

[4], carried out a study on the effects of risk management methods on project performance in Rwandan construction industry a case study of multi storey buildings construction project of RSSB. Risks are very common in construction sector. Risk is the Possibility of suffering loss and the impact on the involved parties. According to [6], all projects are inherently risky because they are unique, constrained, complex, based on assumptions, and performed by people.

As a result, project risk management methods must be built into the management of projects and should be used throughout the project lifecycle. Many construction projects fail because organizations assume that all the projects would succeed and they therefore do not identify, analyze, and provide mitigation or contingencies for the risk elements involved in the project. Society desires that all projects should be performing and has become less tolerant of failure [2]. Pressure is exerted on project managers to minimize the chance of project failure. This increasing pressure for performance which suggests that it is prudent for anyone involved in a project to be concerned about the associated risks and how they can be effectively managed. Traditionally, performance of a project is analyzed on the criteria of quality, budget and time of completion. Two more criteria to determine the performance of a project were added by [1]. Firstly, the project would effectively and efficiently manage risks and, secondly, it should be accepted by the customer. It is known that the cause of the projects failure can be directly related to the extent of risk management methods undertaken. The level of risk management method adopted during project life cycle directly impacts on performance. Furthermore, using risk management methods effectively to manage risk are continuously undertaken throughout the project lifecycle to

enhance project performance. Risk management methods are thus an important tool to cope with such substantial risks in projects performance. The main objective of the enquiry work that underpins this research is to investigate the effect of risk management methods on project performance. In this paper, a case study of RSSB multi-storey already executed project is considered.

**Risk transfer to the third party has positive effect on organization's market share.**

[8], carried out a study on the major factors influencing the performance of local private third party logistics service providers in Southern China. The increase in foreign trade resulting from China's membership of the World Trade Organization (WTO) created substantial pressure on its logistics system and made change inevitable for local private third party logistics service providers (3PLs) in China who found themselves unable to compete with the global logistics players who began operating in China after it joined the WTO. This study provides an empirically-based model to help local private 3PLs formulate appropriate strategies for improving their performance. Although there is a plethora of literature relating to the improvement of organizational performance and the development of quality management models, most of the studies have been conducted in Western countries and used

only one or two organizational performance variables. This study sought to redress that by conducting a study of local 3PLs in southern China to empirically investigate the relationship between the four performance variables of the Balanced Scorecard and the six quality management factors developed for the Malcolm Baldrige National Quality Award. Although it was found that the six factors have a strong relationship with the four organizational performance variables, not all factors are significant constructs to each performance variable. The findings provide local private 3PLs in China with indicators as to which factors do and which factors do not have a positive and significant effect on each of the four organizational performance variables considered. The study clearly shows that performance improvement should not be considered from the financial perspective alone, but should also include customer orientation, business process, and learning and growth.

**Mitigation to a great extent affects the utilization of organization plants capacity.**

[7], carried out a study on Sustainable energy for developing countries. Overall, at least 1.6 billion people one-fourth of the world's population currently live without electricity and this number has hardly changed in absolute terms since 1970. And yet, the electricity required for

people to read at night, pump a minimal amount of drinking water and listen to radio broadcasts would amount to less than 1 percent of overall global energy demand. Developing and emerging economies face thus a two-fold energy challenge in the 21st century: Meeting the needs of billions of people who still lack access to basic, modern energy services while simultaneously participating in a global transition to clean, low-carbon energy systems. And historic rates of progress toward increased efficiency, decarbonization, greater fuel diversity and lower pollutant emissions need to be greatly accelerated in order to do so. To a

significant extent, fortunately, the goal of reducing greenhouse gas emissions may be aligned with the pursuit of other energy-related objectives, such as developing indigenous renewable resources and reducing local forms of pollution. In the near term, however, there will be tensions. Sustainable energy policies are more likely to succeed if they also contribute toward other societal and economic development objectives. Governments should look across policies to maximize positive synergies where they exist and avoid creating cost-cutting incentives.

#### **METHODOLOGY**

The study was conducted using the survey approach. The survey approach was adopted because the respondents were spread all over the departments that make up the study organization; hence, the researcher was interested in obtaining their views through the use of questionnaire and personal interviews. The area of study was Arab Construction Company in Abuja. The idea of choosing Arab Construction Company is being the growing number of staff in the company. Two sources of data were utilized in the study. They included primary and secondary sources. The primary sources were personal interview and the administration of questionnaire to Arab Construction Company managers or top management team and staff in-charge of

Risk management practices. Out of a population of 1150 staff, 297 staff was sampled. The sample size of 297 was chosen after applying the Taro Yamane formula for the determination of adequate sample size. Out of staff sample 260 staff returned the questionnaire and accurately filled. That gave 93 percent response rate. The closed-ended questionnaire was utilized. The validity of the instrument was tested using content analysis and the result was good. The reliability was tested using the Pearson correlation coefficient ( $r$ ). It gave a reliability co-efficient of 0.97 which was also good. The data were analyzed using Z-test for and Chi-square ( $X^2$ ) statistical tool with the aid of Special Package of Statistical Software (SPSS).

### Date Presentation and Analysis

**Table 1: Distribution and Return of Questionnaire**

	Number of copies distributed	Number of copies Returned	Percentage Returned	Number not returned	Percentage not returned
Mgt/Senior Staff	78	70	24	8	2
Junior Staff	219	190	63	29	11
<b>Total</b>	<b>297</b>	<b>260</b>	<b>87</b>	<b>37</b>	<b>13</b>

**Source: Field Survey, 2016**

From the table, 297 copies of questionnaires were distributed and 260 copies of questionnaire were returned and valid representing 87 percent, while 37

copies of questionnaires were not returned representing 13 percent.

**Table 2: Response on the effect of risk avoidance on return on investment in project delivery**

	Mgt/Senior Staff	Junior Staff	Total	Percent
Strongly Disagree	18	67	85	32
Agree	31	101	132	51
Neutral	2	10	12	5
Disagree	8	10	18	7
Strongly disagree	11	2	13	5
<b>Total</b>	<b>70</b>	<b>190</b>	<b>260</b>	<b>100</b>

**Source: Field Survey 2016**

From table 2, 85 respondents out of 260 representing (32 percent) strongly agreed, 132 respondents representing (51 percent) agree that risk avoidance affects on the return on investment in project delivery, 12 respondents representing (5 percent)

were neutral, 18 respondents representing (7 percent) disagree while 13 respondents representing (5 percent) strongly disagree that risk avoidance affects on the return on investment in project delivery.

**Table 3: Response on whether the risk transfer to the third party has effect on delivery on the organization's market share**

	Mgt/Senior Staff	Junior Staff	Total	Percent
Strongly Disagree	21	43	64	25
Agree	24	113	137	53
Neutral	3	13	16	6
Disagree	8	11	19	7
Strongly disagree	14	10	24	9
<b>Total</b>	<b>70</b>	<b>190</b>	<b>260</b>	<b>100</b>

**Source: Field Survey 2016**

From table 3, 64 respondents out of 260 representing (25 percent) strongly agreed, 137 respondents representing (53 percent) agree that the risk transfer to the third party has effect on delivery on the organization's market share. 16 respondents representing (6 percent) were

neutral, 19 respondents representing (7 percent) disagree while 24 respondents representing (9 percent) strongly disagree that the risk transfer to the third party has effect on delivery on the organization's market share.

**Table 4: The extent mitigation effect the utilization of organization plants capacity**

	<b>Mgt/Senior Staff</b>	<b>Junior Staff</b>	<b>Total</b>	<b>Percent</b>
Strongly Disagree	10	39	49	19
Agree	40	127	167	64
Neutral	10	7	17	7
Disagree	7	12	19	7
Strongly disagree	3	5	8	3
<b>Total</b>	<b>70</b>	<b>190</b>	<b>260</b>	<b>100</b>

**Source: Field Survey 2016**

From table 4, 49 respondents out of 260 representing (19 percent) strongly agreed, 167 respondents representing (64 percent) agree that mitigation affect the utilization of organization plants capacity, 17 respondents representing (7 percent) were neutral, 19 respondents representing (7 percent) disagree while 8 respondents representing (3 percent) strongly disagree that mitigation affect the utilization of organization plants capacity.

### **Test of Hypotheses**

In analyzing the four (4) hypotheses stated in chapter one and two were tested using Z- test while hypotheses three and four were tested using friedman's chi-

square tests aided by computer Microsoft Special Package for Social Science (SPSS). Below are the analysis and the testing of the hypothesis formulated to answer the research questions asked to guide the study.

### **Test of Hypothesis One**

H<sub>1</sub>: Risk avoidance has positive effect on the return on investment in Arab Construction Company Abuja, Nigeria.

Z-test was used in hypothesis. The results are discussed below.

**Table 5: Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
<b>VAR000 01</b>	520	1.3032	.67701	1.00	5.00

Source: Microsoft SPSS

**Table 6: One-sample komogorov-Smirnov Test**

		VAR000 01
N		520
Normal	Mean	1.3032
Parameter(A,B)	Std.Deviation	.67701
Most Extreme	Absolute	.432
Differences	positive	.305
	Negative	-.432
Kolmogorov-Smirnov Z		10,337
Asymp. Sig. (2-tailed)		.000

a Test distribution is Normal.

#### Calculated from data.

From the above descriptive statistics table, the mean response value is 1.3032. This indicates that the respondents strongly agree that risk avoidance has positive effect on there return on investment on project delivery.

The Z-test was used in testing if the responses to both assertions are normally distributed and significant. The calculated Z-value of 10.337 was obtained, which is greater than the critical value of 1.96 (95% level of significance). Based on this, the assertion of the respondents presented in

the cross tabulation and mean response are normally distributed. Also, with asymptotic significance (p) value of 0.000 < 0.05, their assertion is significant. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted. Thus, therefore, risk avoidance has positive effect on the return on investment in project delivery.

#### Test of Hypothesis Two

$H_1$ : Risk transfer to the third party has positive effect on market share Arab Construction Company Abuja, Nigeria.

## Z-test

Table 7: Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
VAR000 01	1040	4.4827	.71804	1.00	5.00

Source: Microsoft SPSS

Table 8: One-sample komogorov-Smirnov Test

		VAR000 01
N		1040
Normal	Mean	4.4827
Parameter(A,B)	Std.Deviation	.71804
Most Extreme	Absolute	.357
Differences	positive	.236
	Negative	-.357
Kolmogorov-Smirnov Z		11.503
Asymp. Sig. (2-tailed)		.000

Test distribution is Normal.

b Calculated from data.

From the above descriptive statistics table, the mean response value is 4.4827. This indicates that the respondents strongly agree that risk transfer to the third party has positive effect on organization's market share.

The Z-test was used in testing if the responses to both assertions are normally distributed and significant. The calculated Z-value of 11.503 was obtained, which is greater than the critical value of 1.96 (95% level of significance). Based on this, the assertion of the respondents presented in the cross tabulation and mean response

are normally distributed. Also, with asymptotic significance (p) value of 0.000 < 0.05, their assertion is significant. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted. Thus, risk transfer to the third party has positive effect on organization's market share.

### Test of Hypothesis Three

H<sub>1</sub>: Mitigation to a great extent affects the utilization of plant capacity Arab Construction Company Abuja, Nigeria.

In testing this hypothesis, chi-square test statistics was used.

The results are discussed as below

## Npar: Test Crosstabs

Table 9: Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
VAR0002	*	1300	100.0%	0	0%	1300	100.0%
VAR0003							

Source: Microsoft SPSS

Table 10: VAR00002 \* VAR00003 Cross tabulation

Count

		VAR00003					
		1	2	3	4	5	Total
VAR0000	1	283	162	34	14	2	495
	2	414	247	87	46	11	805
Total		697	409	121	60	13	1300

Source: Microsoft SPSS

Table 11: Chi-Square Tests

	Value	Df	Asymp. Sig. (2-Sided)
Pearson Chi-Square	15.772 <sup>a</sup>	4	.003
Likelihood Ratio	16.788	4	.002
Linear-by-Linear Association	12.864	1	.000
N of Valid Cases	1300		

a 2 cells (10%) have expected count less than 5. The minimum expected count is 4.95.

**Decision Rule**

The decision rule that governs the acceptance or rejection of the null hypothesis is that if the calculated Chi-Square value is greater than the tabulated Chi-Square value, or if the sig. value is lesser than the critical value at which the test was carried, the null hypothesis should be rejected; otherwise the null should be accepted.

Source: Microsoft SPSS

With a Pearson Chi-Square ( $\chi^2$ ) calculated value of 15.772, which is greater than the tabulated chi-square value ( $\chi^2$ ) (at  $df = 2$ ) of 5.991, the null hypothesis should be rejected. This result is also strengthened by the asymptotic significance value of 0.000 which is lesser than the critical value of 0.05 at which the test was carried out. Thus, we accept the alternate hypothesis which states that Mitigation to

a great extent affects the utilization of organization plants capacity.

### DISCUSSION OF FINDINGS

#### **Risk avoidance has positive effect on the return on investment on project delivery**

The calculated Z-value of 10.337 was obtained, which is greater than the critical value of 1.96 (95% level of confidence). However, APM (2006), insists all projects are inherently risky because they are unique, constrained, complex, based on assumptions, and performed by people. As a result, project risk management must be built into the management of projects and should be used throughout the project lifecycle. Many projects fail because organizations assume that all the projects would succeed and they therefore do not identify, analyze, and provide mitigation or contingencies for the risk elements involved in the project. Therefore, risk avoidance has positive effect on the return on investment in project delivery.

#### **Risk transfer to the third party has positive effect on organization's market share**

In the analysis of the review in hypothesis one, the calculated Z-value of 11.503 was obtained, which is greater than the critical value of 1.96 (95% level of significance).

Therefore, the capacity as financial intermediaries and suppliers of risk management services, insurance companies has performed important functions in industrial economies such as risk diversification, risk transfer, and loss mitigation, [5]. However, risk transfer to the third party has positive effect on organization's market share.

#### **Mitigation to a Great extent affects the Utilization of Organization Plants Capacity**

In the hypothesis two, it was stated that there is mitigation affects the utilization of organization plants capacity to a great extent. Therefore, chi-Square ( $\chi^2$ ) calculated value of 15.772, which is greater than the tabulated chi-square value ( $\chi^2$ ) (at  $df = 2$ ) of 5.991. Therefore, mitigation to a great extent affects the utilization of organization plants capacity, hence, planning the use of manufacturing capacity to turn out the highest-quality products while maximizing profit is a key to the success of the business. Capacity utilization depends on market demand and on scheduling production for the most efficient use of your facilities [2].

### CONCLUSION

It has been deduced that provision of effective operational risk management practice and construction project delivery

help to increase the level of performance in an organization thereby boosting the level of productivity. The management of

COMAG Company knows the effect of operational risk management practice and they apply it to all areas of their operations. They hardly record much deficiency, employee turnover and absenteeism, or delay on delivery. The

presence of operational risk reduces the quality of employee recruitment and selection carried out, affects the commitment of staff and impacts staff reward management in the company.

### RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

- i. The management should acknowledge the presence of operational risk and work towards reducing its negative impacts on activities within the system.
- ii. The management machinations within company systems especially as it relates to employee recruitment and

selections, and staff reward management should be monitored closely by company's management so that its negative effects do not result in reduced staff commitment.

- iii. Operational risk management when used positively can champion courses and policies that work toward the achievement of goals in organizations.

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