

**EVALUATION OF RISK MANAGEMENT PROCEDURES ON ROAD
CONSTRUCTION IN MINNA, NIGER STATE**

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ABSTRACT

This paper highlighted the impacts of risk management on Nigerian road construction. Risk management is now a critical component of any project management organization. Identifying all foreseeable risks and evaluating their likelihood of occurring as well as potential hazards that could significantly affect the project are the goals of risk management. The recent upward trend in road construction and rehabilitation in Minna and its environment by the present administration has necessitated the study. Road construction projects are frequently faced with risks ranging from equipment breakdown, material shortages, and labor-related issues. These risks, if not properly managed, compromise the efficiency of project delivery and the attainment of sustainable infrastructure development. Two objectives are set for the paper (i) to identify risk factors that affect the delivery of road construction projects in Minna. (ii) to assess risk management practices of head office managers on road construction projects. The data were collected using purposive sampling. 12 risk factors were examined and concluded that the delivery of road construction projects is significantly but moderately impacted individually by all the 12 risk factors examined in this study.

Keywords: Risk, Management, Road, Construction, Hazards

INTRODUCTION

The construction industry is a very important sector in every nation and its development as it provides the infrastructure that is necessary for economic growth, social interaction and improved standard of living. In particular, road development projects are essential for improving transportation, lowering transportation costs, and promoting trade both within and between different areas. However, because of their complexity, numerous stakeholders, unpredictable environments, and reliance on resources like plant, materials, labor, and finance, these projects are inevitably risky. Risks can actually occur at any stage of a project. Sometimes it is related to specific tasks and at other times it may have its origin outside the project and may appear without prior warning. Generally speaking, risks that occur in the later phases of a project can cost more time and money than risks that occur in the initial phases. The main reason, is that total costs and the value of work in progress increase over time (Agnieszka, 2024)

Poor risk management frequently results in overspending, delays, low quality work, and in the worst situations, complete project abandonment. Because of weak institutional frameworks, poor planning, and slow technology growth, these issues are considerably more severe in developing nations like Nigeria. Understanding how risk management practices influence the delivery of road construction projects in this context is therefore essential for improving performance and ensuring value for money. Despite the importance of road construction and infrastructure to economic development, road projects in Minna Niger state have continued to experience a lot of challenges which generally include delay in completion, cost and budget overruns, low quality of work. This study therefore addresses the gap by analyzing the extent to which project risk management influences the performance and delivery of road projects in Minna.

LITERATURE REVIEW

The construction industry is exposed to more risk and uncertainty than perhaps any other industry, and that, this is due to the unique features and complexity of the construction activities, such as

long period, complicated process, abominable environment, financial intensity and dynamic organization structures (Akintoye and Macleod, 1997). Enshassi *et al* (2008) in their study opined that Construction industry is a risky industry with uncertainties due to many external and internal factors that influence the construction process. Thus, the term “Construction” can include the erection, repair, and demolition of diverse structures as houses, offices, shapes, dams, etc. (Mousa, 2005). No matter the depth of planning and the rigidity with which the contract programs are adhered to, there will always be factors that tend to prevent the project objectives from being realized (Ibironke *et al*, 2011). Whenever a construction project is embarked upon, there are some risk elements inherent in it, such as physical, environmental, logistics, financial, legal and political risks among others (Oyewobi *et al.*, 2012). Risk in construction has been the object of attention because of time and cost overruns associated with construction projects (Akintoye and Macleod, 1997). This was supported by Ibironke *et al* (2011) who attributed the reasons to either unforeseen or foreseen events which uncertainty was not appropriately accommodated.

Risk is inherent in all human endeavors, including construction activities, and the risk elements involved are diverse and varied (Odeyinka, 2000). That the success or failure of any venture depends crucially on how to deal with these risks (Dey and Ogunlana, 2004 and cited in Oyewobi *et al.*, 2012). Oxford Advanced Learner’s Dictionary (1995) defines risks as the chance of failure or the possibility of meeting danger or of suffering harm or loss. Oyewobi *et al* (2012) asserted the common consequences of project risks to include amongst others the cost overruns, time overruns, poor quality, and disputes among the partings to a construction contracts. The study also added that, risk is an important issue to contractors as well as clients and consultants of the industry. Oyewobi *et al* (2012) opined that the problems of risk assessment are complex and poorly understood in practice. The Association of Project Managers Body of Knowledge (2006) defined project risk as an uncertain event or set of circumstances that, should it occur will have an effect on achievement of one or more project objectives. Hillson (2002) stated that this effect could either be positive (opportunity) or negative (threat). The construction industry has changed rapidly over the past 10 years; companies are faced with more risk and uncertainty than ever before (Flanagan, 2003). There are diversified expectations, needs, risks, interests and constraints which makes client-contractor collaboration difficult in a multi-party working situation (Lau and Rowlinson, 2009). Effective collaboration and a conscious sharing of project risks between clients, contractors and consultants are important factors for a successful risk management process (Akintoye and Macleod, 1997 and Osipova, 2007)

Survey Respondents

On-field and management staff of these road construction firms were considered better placed to provide this information on the basis that; they have a better and more accurate knowledge about how any given project is being carried out, since they are directly responsible for the construction of the project. A survey package comprising of a covering letter, survey instructions and questionnaire were taken to the selected road construction firms.

Structure of the Questionnaire

Considering that the questionnaire was designed primarily to source information on the impact of project risk management on the delivery of construction of road projects in Minna, two sections were created in the questionnaire (Section A & B). The first section (Section A) was designed to seek respondent's demographic information. Specifically, it requested that information which would reveal whether the type of respondents required by the study, filled the questionnaires and consequently, whether the information supplied in the other sections of the questionnaires can be relied on. As it was anticipated/expected that professionals/personnel on the field or middle level management of any given firm will have a more comprehensive knowledge about how projects are being executed by their firms, the demographic information requested in this section were precisely;

the of the respondent as well as the number of years of experience in practice, the size of their company.

Analysis of Respondents’ Demographics

This section presents the results of the five (5) demographic analyses carried out on the field survey data of this study. The demographic variables examined include the current role of the respondents at their place of work, highest educational qualification obtained, the number of years of experience in the construction industry, the size of the company that the respondents worked for, and whether the respondents had ever experienced major project delays due to risks. The results of these analyses are presented in Table 1.0.

The results presented in Table 1.0 revealed that management staff made up only 12.8% of the sample. The balance of 87.2% of the sample was made up by the on-field supervisory staff. The disparity in the numbers of the different categories of staff was attributable to the fact that a single head office usually has several sites under its control. These sites contain many on-field staff, in contrast to the few management staff at the head office.

As regards the educational attainments of the respondents which was also presented in Table 1.0, 19.2% were educated only up to secondary level, while 30.8% were educated up to the Ordinary National Diploma/National Certificate of Education (OND/NCE) level. Respondents who had tertiary education up to the Higher National Diploma/Bachelor degree level made up 23.1% of the sample, while 26.9% of the respondents had acquired postgraduate qualifications. The study has thus obtained data from respondents possessing a mix of educational qualifications which increases the likelihood that the respondents possessed necessary knowledge of road construction risks.

Table 1.0: Demographic Information of the Respondents

	Frequency (n)	Percentage (%)
Current role		
Managerial Staff	10	12.8
On-Field Worker	68	87.2
Highest educational qualification		
SSCE	15	19.2
OND/NCE	24	30.8
HND/BSc	18	23.1
MSc and above	21	26.9
Other	0	0.0
Years of experience in the construction industry		
Less than 1 year	8	10.3
1–3 years	13	16.7
4–6 years	18	23.1
7–10 years	19	24.4
More than 10 years	20	25.6
Size of company		
Small (1–20 employees)	14	17.9
Medium (21–100 employees)	46	59.0
Large (101 and above)	18	23.1
Experienced major project delays due to risks?		
Yes	34	43.6
No	25	32.1
Not sure	19	24.4

Source: Author’s fieldwork (2025)

The results presented in Table 2.0 show that all 12 risk factors individually exert a moderate impact on the delivery of road construction projects. The level of impact was derived based on the MIS of the factors, which ranged from 3.37 for the highest ranked factor to 2.74 for the lowest ranked factor. The discovery that all of the factors had only a moderate impact on road project delivery allowed further analysis to be carried out to reveal whether risk factor identification outcomes differed, when carried out by management staff as opposed to on-field staff.

Table 2.0: Identification of Risk Factors

ID Code	Risk factors	Mean Score	SD	RII	Rank	Level of impact
B1.B1 / B2.B1	Delays in asphalt, bitumen, and gravel supply (Rain damages stored materials)	3.37	1.38	0.67	1st	Moderate
B1.B2 / B2.B2	Inflation causes material price fluctuations (Poor-quality asphalt makes road uneven)	3.27	1.27	0.65	2nd	Moderate
B1.C2 / B2.C2	Insecurity affects workforce presence (Lack of PPE puts workers at risk)	3.21	1.44	0.63	3rd	Moderate
B1.A1 / B2.A1	Equipment breakdowns are a frequent cause of delay (Machines are unavailable when needed)	3.19	1.26	0.63	4th	Moderate
B1.B4 / B2.B4	Material theft occurs frequently (Materials are poorly measured or mixed)	3.01	1.30	0.59	5th	Moderate
B1.C3 / B2.C3	Community conflicts affect labor performance (Extreme heat/rain affects work output)	2.96	1.37	0.58	6th	Moderate
B1.C1 / B2.C1	Shortage of skilled workers delays progress (Absenteeism affects team performance)	2.91	1.40	0.57	7th	Moderate
B1.B3 / B2.B3	Lack of secure storage for materials (Bitumen often arrives late or in short supply)	2.90	1.42	0.57	8th	Moderate
B1.A2 / B2.A2	Equipment not suited for terrain affects delivery (Terrain issues damage equipment)	2.88	1.42	0.57	9th	Moderate
B1.A4 / B2.A4	Frequent power/fuel shortages disrupt machinery (Training on machine use is inadequate)	2.86	1.34	0.56	10th	Moderate
B1.A3 / B2.A3	Poor logistics for transporting heavy equipment (Tools are unsafe or outdated)	2.82	1.32	0.56	11th	Moderate
B1.C4 / B2.C4	Religious/cultural events reduce labor availability (Communication with supervisors is poor)	2.74	1.30	0.54	12th	Moderate

Source: Author’s fieldwork (2025)

Impact of risk management practices on reducing delays and cost overruns on road project

The results in Table 3.0 showed that none of the four correlations between ‘reduced delays and cost overruns’ (the second of five aspects of road project delivery that were tested) and the four groups of risk factors was statistically significant. This was because the ‘Sig.’ values obtained (which ranged from 0.115 to 0.448) were much higher than the preset ‘alpha’ (α) level of 0.05. The strength of the correlations between ‘reduced delays and cost overruns’ and all four risk factor groups was very weak, the highest being 3.24%. This meant that none of the risks accounted for more than 3.24% of any reductions in delays and cost overruns in the delivery of road projects. This meant that all of the four risk factor groups (material-related, plant-related, manpower-related, and environmental/external risks) did not exert significant impact on reductions in delays and cost overruns in the delivery of road projects. Another inference drawn from this result was that using the impact of risks to predict the level of reductions in delays and cost overruns in road project

delivery is impossible because none of the coefficients of determination (R^2 values) obtained was up to 70%.

Table 3.0: Correlation analysis of risk factors' impact on reducing delays and cost overruns

x	y	N	Correlation Coefficient (Spearman's rho)	R ² (%)	Sig. (2-tailed)	Strength of Correlation	Remark
Plant-Related Risks	Reduced delays cost overruns	78	-.146	2.13	.202	Very weak	NS
Material-Related Risks	Reduced delays cost overruns	78	.093	0.86	.418	Very weak	NS
Manpower-Related Risks	Reduced delays cost overruns	78	.180	3.24	.115	Very weak	NS
Environmental External Risks	Reduced delays cost overruns	78	.087	0.76	.448	Very weak	NS

Source: Author's fieldwork (2025)

Notes: *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed); NS = Not Significant; SS = Statistically Significant

Conclusion

This study examined risk management practices on road construction projects in Minna, with a view to identifying measures for improving the positive impact of such practices. The analysis of the data employed mean item scores and Spearman rank-correlation analysis. The results of the analysis carried out led to the conclusions presented in this chapter.

The study concluded that the delivery of road construction projects is significantly but moderately impacted individually by all the 12 risk factors examined in this study. The ranking of risk factors in terms of impact differed between management staff and on-field staff. Head office management staff are more concerned about the risks that can threaten material and plant availability than those risks that have to do with labour availability (5 out of 12 risk factors). On the other hand, on-field supervisory staff devote an almost equal level of attention to all 12 risk factors, supporting the thinking that site supervisors must maintain constant awareness of all risks to prevent disruptions to the works. On a final note, this study has concluded that only material-related risks were significantly correlated with improved delivery of road construction projects in Minna, Niger State.

Recommendations

As a result of the conclusions reached in this study, the following recommendations have been made:

1. Site supervisors on road construction projects need to be continuously exposed to trainings that would empower them to recognize other risks outside of the 12 that this study has examined.
2. There is need for more research into the financial impact of the 12 risks examined in this study. This could provide a reliable guide to whether the present focus of head office management staff is too restrictive or if it is adequate. It will also shed more light on what other risks could be included in the focus.
3. The tools that will help on-field supervisory staff mitigate the effects of the 12 risk factors examined in this study should be provided. Some of these tools and facilities are (i) Secure site housing that prevents rain damage to materials, (ii) Personal protective equipment (PPE) that reduces the risks that workers are exposed to, and (iii) Purchasing high quality materials to guarantee the quality of the finished roads.
4. As at present both head office management staff and on-field supervisory staff consider that only material-related risks need to be handled to ensure improved delivery of road construction projects. Since this study has established that other risks also exert moderate

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impact on the delivery of road projects, it was recommended that more attention needs to be paid to these 'other risks'. Such risks include manpower, plant, and environmental risks.

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