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Factors Influencing Time Performance of Road Construction Projects in Bauchi Metropolis, Bauchi State, Nigeria

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ABSTRACT

Time overrun remains a critical challenge in the Nigerian road construction sector, contributing to cost escalation, project abandonment, and poor service delivery. In Bauchi Metropolis, several flagship road projects have recorded significant delays despite high budgetary allocations. This study evaluated the key factors influencing time performance of road construction projects in Bauchi Metropolis. A census approach was adopted with 116 questionnaires administered to clients, consultants, and contractors involved in ongoing projects. A total of 113 responses were retrieved and analyzed using descriptive statistics, mean score, and Relative Importance Index (RII). Findings revealed that the top five factors influencing time performance were: ineffective planning and scheduling by contractors (RII = 0.829), poor site management and supervision (RII = 0.827), difficulties in financing projects (RII = 0.794), poor communication and coordination by contractors (RII = 0.786), and delay in progress payments by owners (RII = 0.878). Among owner-related factors, delay in payment and poor coordination were most significant. Among external factors, subsurface conditions and delay in utility services ranked highest. The dominant effects of time performance failure were time overrun (RII = 0.903), cost overrun (RII = 0.850), project abandonment (RII = 0.796), and disputes (RII = 0.775). The study concludes that contractor-related and owner-related factors are the primary drivers of delays in Bauchi Metropolis. It is recommended that contractors strengthen planning and resource mobilization, while clients ensure timely payments and prompt decision-making to improve project delivery time.

KEYWORDS: Road Construction, Time Performance, Project Delays, Bauchi Metropolis, Cost Overrun

1.0 INTRODUCTION

Timely completion of road projects is one of the primary goals of clients and contractors globally. This is because delays result in additional costs and loss of potential revenue for all parties involved. The completion of construction projects within the agreed duration is a critical measure of project success. The problem of time and cost overruns is particularly pronounced in developing countries like Nigeria. Several factors influence time performance, including actions of clients, consultants, contractors, economic climate, government policies, and natural occurrences.

Previous studies have identified specific causes. Agyekum-Mensah and Knight [1], noted poor stakeholder management and weak execution as key causes of delay in the construction industry. Adebayo et al. [2], reported that inadequate equipment, poor managerial skills, equipment failure, material shortage, and inaccurate estimates affect timely completion in construction projects.

In Bauchi Metropolis, BASIDMA rated road projects as low performing in terms of time. A 42-month project has achieved only 7% completion. The Wunti-Central Market Flyover was delayed by 9 months, the Federal Low-cost Road by over 7 years, and Dorawan Dillai road was stopped at 50%. These delays have caused hardship for residents and transporters. Key site-specific delays include failure to mobilize adequate resources and equipment, delayed development of quarry and crusher, non-commencement of asphalt and concrete production, and non-provision of engineer's facilities such as offices, laboratories, and vehicles as stipulated in the contract.[3].

Several studies have examined factors influencing time performance in road construction projects across different contexts. Bounthipphasert et al. [4], investigated causes of delays in road construction projects in Laos and identified resource mobilization and planning as critical factors. Abdilkerim et al. [5], analyzed non-excusable delays affecting contractor performance in public construction projects in Ethiopia.

In the Nigerian context, Mamman and Umesi established that poor project planning and scheduling, and ineffective stakeholder management were key contributors to poor project performance. Similarly, Aiyewalehinmi, Oluyemi-Ayibiowu and Okwueze, in a study of building projects in Ondo State, revealed that inadequate equipment, poor managerial skills, and material shortages affected timely completion.[6][7]. Aladayleh et al., [8], in a study at a Jordanian public university, identified poor stakeholder management and procurement issues as major delay factors. Firdissa, focusing on Oromia Roads projects, highlighted design issues, financial management, and slow decision-making as critical delay factors. Ghanim, in a study of large public construction projects in Jordan, reported similar findings on planning and financial problems [9][10]. This study therefore seeks to bridge this gap by evaluating the factors influencing time performance of road construction projects, with specific focus on selected projects within Bauchi town.

2.0 METHODOLOGY

2.1 Research Design

This study adopted a descriptive research design to provide a quantitative description of the opinions and perceptions of stakeholders involved in road construction. A quantitative approach was employed to analyze the research questions, as it allows for empirical measurement and objective analysis of social phenomena.

2.2 Area of the Study

The study was conducted in Bauchi Metropolis, Bauchi State, Nigeria. The Map of Bauchi is shown in Figure 1. The metropolis lies between latitudes 9.3°N and 12.3°N and longitudes 8.5°E and 11°E, at an elevation of 1,999 feet above sea level, with an average annual rainfall of 43.1 inches.

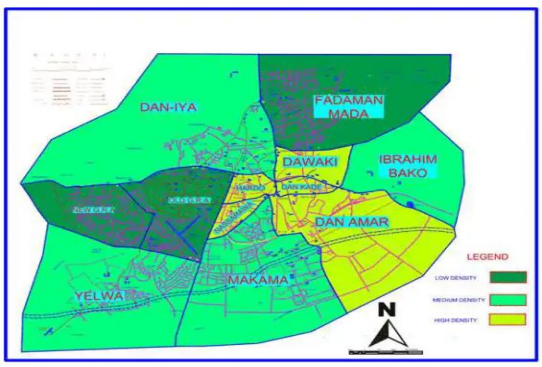

Figure 1: Map of Bauchi Showing the study Area

2.3 Population and Sampling Technique

The target population comprised clients, consultants, and contractors currently involved in ongoing road construction projects in Bauchi Metropolis as shown in Table 1.

Table 1: Sample Size

S/N	Sample	Number
I	Clients	30
2	Consultants	41
3	Contractors	45
	Total	116

In Table 1, the target population for this study consisted of all stakeholders directly involved in ongoing road construction projects in Bauchi Metropolis. A total of 116 respondents were identified from the Ministry of Works and Transport records for 2026. This comprised 30 clients, 41 consultants, and 45 contractors. A census sampling technique was adopted because the population size was manageable, ensuring that the views of all key parties responsible for project delivery were captured.

2.4 Method of Data Collection

Primary data were collected using a structured questionnaire. The instrument utilized a 5-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree to measure respondents' perceptions on time performance factors.

2.5 Validity and Reliability Test

Content validity was ensured through expert review and alignment with relevant literature. Reliability was tested using Cronbach's Alpha coefficient in SPSS, with values closer to 1 indicating higher internal consistency.

2.6 Method of Data Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics including frequencies, percentages, mean scores, and ranking were used to identify factors influencing time performance and their effects. The analytical techniques for each objective are summarized in Table 2.

Table 2: Analytical Technique for Each Objective

S/n	Objective	Technique of Analysis
1	Factors influencing time performance of road construction projects	Mean scores and ranking
2	Effects of time performance factors on road construction projects	Ranking (R) of the weighted average of the mean item score (MIS)

3.0 RESULTS AND DISCUSSIONS

3.1 Questionnaire Administration and Response Rate

A total of 116 questionnaires were distributed to clients, consultants, and contractors involved in road construction projects in Bauchi Metropolis and the result is shown in Table 3.

Table 3: Response Rate

Parameter	Frequency	Percentage
Responded	113	97
Non-Response	3	3
Total	116	100.0

A total of 116 questionnaires were distributed to the identified respondents. Out of this, 113 questionnaires were retrieved, representing a response rate of 97%, while only 3 questionnaires were not returned. The high response rate was achieved through personal administration of the questionnaires and follow-ups. This indicates a strong level of participation and suggests that the data collected is reliable for analysis.

3.2 Demographic Characteristics of the Respondents

The demographic traits of the respondents involve social traits such as gender, age etc. The results are shown in Tables 4 to 11.

Table 4: Gender of the Respondents

Gender	Frequency	Percentage
Male	110	97
Female	3	3
Total	113	100.0

The gender distribution shows that 110 respondents representing 97% were male, while only 3 respondents representing 3% were female. This indicates that road construction in Bauchi Metropolis is still largely dominated by males, which reflects the general trend in the Nigerian construction industry.

Table 5: Respondents Economic Sector

Gender	Frequency	Percentage
Public sector	71	62.8
Private sector	42	37.2
Total	113	100.0

Results in Table 5 show that 71 respondents representing 62.8% work in the public sector, while 42 respondents representing 37.2% work in the private sector. This implies that most of the road projects in Bauchi Metropolis are public-driven and managed by government agencies.

Table 6: Respondents Organization

Organization	Frequency	Percentage
Academia	5	4
Contracting firm	35	31
In-house consultants	71	63
Out-source consultants	2	2
Other	-	-
Total	113	100.0

The majority of respondents as presented in Table 6 shows that 71 representing 63%, were from in-house consulting firms. Contracting firms accounted for 35 respondents representing 31%, academia had 5 respondents representing 4%, and out-source consultants were 2 respondents representing 2%. This shows that in-house consultants play the dominant role in supervising road projects in the study area.

Table 7: Highest level of Academic Qualification of Respondents

Qualification	Frequency	Percentage
OND/ND	5	4
HND/BSc/BTech	95	84
MSc/BTech	10	9
PhD	3	3
Others	-	-
Total	113	100.0

In Table 7, 95 respondents representing 84% had HND/BSc/BTech degrees. 10 respondents representing 9% had MSc, 5 respondents representing 4% had OND/ND, and 3 respondents representing 3% had PhD. This indicates that most respondents were well educated and professionally qualified.

Table 8: Educational Specialization

Specialization	Frequency	Percentage
Architecture	21	19
Building	19	17
Civil engineering	36	32
Quantity surveying	32	28
Others	5	4
Total	113	100.0

Regarding specialization, 36 respondents representing 32% were Civil Engineers, 32 respondents representing 28% were Quantity Surveyors, 21 respondents representing 19% were Architects, 19 respondents representing 17% were Builders, and 5 respondents representing 4% were from other fields. This shows that the respondents had relevant technical backgrounds for road construction.

Table 9: Respondents Statutory Body

Statutory Body	Frequency	Percentage
ARCON	21	19
CORBON	19	17
COREN	36	32
QSRBN	32	28
Others	5	4
Total	113	100.0

Professional registration revealed that 36 respondents representing 32% were registered with COREN, 32 respondents representing 28% with QSRBN, 21 respondents representing 19% with ARCON, and 19 respondents representing 17% with CORBON. This confirms that most respondents were registered professionals bound by ethical standards.

Table 10: Respondents years of work experience

Statutory Body	Frequency	Percentage
1-5 years	21	19
6-10 years	19	17
11-15 years	36	32
16-20 years	32	28
More than 20 years	5	4
Total	113	100.0

For work experience, 36 respondents representing 32% had 11–15 years, 32 respondents representing 28% had 16–20 years, 21 respondents representing 19% had 1–5 years, 19 respondents representing 17% had 6–10 years, and 5 respondents representing 4% had more than 20 years. This shows that most respondents were experienced and capable of giving informed opinions.

Table 11: Respondents Managerial Status

Statutory Body	Frequency	Percentage
Lower management	11	10
Middle Management	86	76
Top management	16	14
Others	-	-
Total	113	100.0

In terms of managerial position, 86 respondents representing 76% were in middle management, 16 respondents representing 14% were in top management, and 11 respondents representing 10% were in lower management. This indicates that the responses came largely from decision-makers directly involved in project execution.

3.3 Factors Influencing Time Performance

The result of the study conducted on factors influencing the time performance of road construction project is shown in Tables 12-16.

Table 12: Owner Related Factors

Item Code	Owner related factors	(1)	(2)	(3)	(4)	(5)	RII	Rank
oq1	Delay in progress payments by owner	0	1	4	48	44	0.8784	1
oq2	Delay to furnish and deliver the site to the contractor by the owner	1	5	55	23	33	0.6866	5
oq3	Change orders by owner during Construction	2	5	36	42	12	0.7175	4
oq4	Late in revising and approving design documents by owner	0	28	32	26	11	0.6412	8
oq5	Delay in approving drawings and sample materials	0	23	32	40	2	0.6433	7
oq6	Poor communication and coordination by owner and other parties	0	1	3	57	36	0.8639	2
oq7	Slowness in decision making process by owner	0	1	9	55	32	0.8433	2
oq8	Conflicts between joint ownership of the project	7	34	32	12	12	0.5753	10
oq9	Unavailability of incentives for contractor for finishing ahead of schedule	4	15	28	37	13	0.6824	6
oq10	Suspension of work by owner	14	20	24	19	22	0.6309	9
	Average RII of owner related factors						0.7163	

The analysis of owner-related factors gave an average RII of 0.716. The most significant factors were delay in progress payments by the owner with RII of 0.878, poor communication and coordination by the owner with RII of 0.864, and slowness in decision making by the owner with RII of 0.843. This shows that financial delays and administrative inefficiencies from clients are major contributors to time overrun.

Table 13: Contractor Related Factors

Item Code	Contractor related factors	(1)	(2)	(3)	(4)	(5)	RII	Ranking
cq1	Difficulties in financing project by Contractor	1	2	36	18	40	0.7938	3
cq2	Conflicts in sub-contractors schedule in execution of project	0	18	45	32	2	0.6371	10

cq3	Rework due to errors during Construction	0	18	54	15	10	0.6351	11
cq4	Conflicts between contractor and other parties (consultant and owner)	8	28	35	19	7	0.5773	13
cq5	Poor site management and supervision by contractor	2	1	20	33	41	0.8269	2
cq6	Poor Communication and coordination by contractor with other parties	0	1	23	55	18	0.7855	4
cq7	Ineffective planning and scheduling of project by contractor	0	0	31	21	45	0.8288	1
cq8	Improper construction methods implemented by contractor	1	11	45	11	29	0.7155	5
cq9	Delays in subcontractors work	0	6	48	35	8	0.6928	7
cq10	Inadequate contractor's work	2	2	52	23	18	0.7093	6
cq11	Frequent change of sub-contractors because of their inefficient work	0	19	40	27	11	0.6619	9
cq12	Poor qualification of the contractor's technical staff	2	32	35	19	9	0.6021	2
cq13	Delay in site mobilization	0	11	48	29	9	0.6742	8
	Average RII of contractor related factors						0.7031	

Contractor-related factors had an average RII of 0.703. The top factors were ineffective planning and scheduling by the contractor with RII of 0.829, poor site management and supervision by the contractor with RII of 0.827, and difficulties in financing the project by the contractor with RII of 0.794. This indicates that internal weaknesses in contractor management and funding are critical causes of delay.

Table 14: Consultant Related Factors

Item Code	Consultant related factors	(1)	(2)	(3)	(4)	(5)	RII	Ranking
sq1	Delay in approving major changes in the scope of work	7	19	22	29	20	0.6742	2
sq2	Poor communication and Coordination	0	10	71	5	11	0.6351	4
sq3	Inadequate experience of consultant	17	24	18	36	2	0.5629	7
sq4	Mistakes and discrepancies in design Documents	16	16	33	15	17	0.6021	5

sq5	Delays in producing design Documents	16	2	52	2	25	0.6371	3
sq6	Unclear and inadequate details in Drawings	13	20	37	20	7	0.5753	6
sq7	Insufficient data collection and survey before design	10	10	24	36	17	0.6825	1
sq8	Unused of advanced engineering design software	16	24	32	12	13	0.5629	7
	Average RII of consultant related factors						0.6165	

For consultant-related factors, the average RII was 0.617, the lowest among all categories. The most significant factors were insufficient data collection and survey before design with RII of 0.683, delay in approving major changes in scope of work with RII of 0.674, and delays in producing design documents with RII of 0.637. This suggests that consultants contribute to delays mainly through poor pre-contract preparation and slow approvals.

Table 15: External Factors

Item Code	External factors	(1)	(2)	(3)	(4)	(5)	RII	Ranking
xq1	Effects of subsurface conditions (e.g. soil, high water table, etc.)	0	18	30	25	24	0.7134	1
xq2	Delay in obtaining permits from municipality	18	36	28	15	0	0.4825	5
xq3	Hot weather effect on construction activities	29	27	25	7	9	0.4763	6
xq4	Traffic control and restriction at job site	24	35	13	9	16	0.5134	1
xq5	Accident during construction	32	24	25	16	0	0.4515	7
xq6	changes in government regulations and laws	31	29	27	1	9	0.4515	7
xq7	Delay in providing services from utilities (such as water, electricity)	7	25	37	20	8	0.5838	2
xq8	Delay in performing final inspection and certification by a third party.	8	33	33	14	9	0.5649	3
	Average RII of external factors						0.5309	

External factors had an average RII of 0.531. The leading factors were effects of subsurface conditions such as soil and high-water table with RII of 0.713, delay in providing services from utilities with RII of 0.584, and delay in performing final inspection and certification by third parties with RII of 0.565. Although external factors were less dominant, site and utility-related issues still affect project schedules.

Table 16: Effects of Time Performance Factors on Road Construction Projects

Item Code	Effects of Time Performance factors	(1)	(2)	(3)	(4)	(5)	RII	Ranking
eq1	Time overrun	0	2	1	39	55	0.9031	1

eq2	Cost overrun	0	1	7	56	33	0.8495	2
eq3	Poor quality	5	6	53	10	23	0.6825	6
eq4	Bad public relation	0	35	33	13	16	0.6208	8
eq5	Dispute	1	8	25	31	32	0.7753	4
eq6	Negotiation	8	7	39	25	18	0.6784	7
eq7	Litigation	0	6	50	29	12	0.6969	5
eq8	Total Abandonment	1	3	24	38	31	0.7959	3
	Average RII of effect of time performance factors						0.7503	

The effects of poor time performance had an average RII of 0.750. The most dominant effects were time overrun with RII of 0.903, cost overrun with RII of 0.850, total abandonment of project with RII of 0.796, and disputes with RII of 0.775. This confirms that delays lead directly to financial losses, project failure, and strained relationships among stakeholders.

4.0 CONCLUSION

This study assessed the factors influencing time performance of road construction projects in Bauchi Metropolis. Based on responses from 113 professionals, contractor-related factors were the most significant drivers of delay, with ineffective planning and scheduling and poor site management ranked highest. Owner-related factors, particularly delay in progress payments and poor coordination, also had strong influence. External factors such as subsurface conditions and utility delays played a secondary role. The primary effects of poor time performance were time overrun, cost overrun, project abandonment, and disputes, which collectively undermine the delivery of quality road infrastructure. The demographic analysis confirmed that respondents were qualified and experienced, lending credibility to the findings.

5.0 RECOMMENDATIONS

1. Contractors adopt robust planning, scheduling, and site management practices and ensure adequate financing before mobilization.

2. Clients make timely payments, expedite approvals, and improve communication with project teams.

3. Consultants conduct thorough site investigations and reduce delays in design approvals.

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