

Inflation and Quality Attributes in Construction Projects in Cities: An Empirical Analysis of the Federal Capital Territory (FCT) Abuja, Nigeria

Daniel A¹, Okosun Senator Endurance², Athenkosi Sogaxa³, Kelvin Omoufeba Okosun⁴ and Idoko O⁵

^{1&5}Department of Construction Management, Nasarawa State University, Keffi, Nigeria

²Department of Geography, Federal University Lokoja, Lokoja, Nigeria

³Construction Management and Quantity Surveying, Cape Peninsula University of Technology, South Africa

⁴Karkel Integrated Synergy Limited, Nigeria

Abstract

Given the current inflationary effects in the country, this study examines the nexus between inflation and the quality attributes in construction projects in FCT, Abuja, to enhance real estate construction and mitigate the effects of inflation on construction in Nigeria. An exploratory research design was adopted using both primary and secondary sources of data. Two sets of questionnaires were administered, one to the property owners and the other to the Real Estate Developers. Using stratified sampling techniques, structured questionnaires were administered to the respondents, while 95 (63.33) and 210 (52.50) copies were retrieved from the Real Estate Developers and Private Landowners, respectively. Key findings from the study indicate that the rate of inflation increased from 11.40% in 2019 to 26.31% in 2024. These consequently affected the prices of building materials within the said periods, as the major quality attributes identified were sustainability, strength, and performance of structures, ranked 1st and 2nd respectively, with mean scores of 4.7368. For suitability attributes among Real Estate Developers, meeting requirements topped the list (4.6737), followed by proper handling (2nd, 4.4947) and desirability/demand (3rd, 4.3474). Results showed significant differences in the opinion of the respondents based on the nature of project qualities. It was concluded that, for the Nigerian economy to improve, policy formulations, intervention strategies such as the use of local building materials, appropriate budgeting, inflation reduction measures, amongst others, are essential to mitigate the effects of inflation and enhance real estate development in the country.

Keywords: Construction, FCT Abuja, Inflation, Nigerian Economy, Quality Attributes

1. Introduction

Nigeria's construction industry is a nascent sector that is seen as a development engine whose success indicates the state of the country's economy (Akanni *et al.*, 2014). The construction sector plays a pivotal role in the socio-economic advancement of a country, primarily responsible for the physical development and transformation of the built environment. As highlighted by Alaloul *et al.* (2020) and John-Nwagwu *et al.* (2021), construction activities are vital drivers of economic growth. This industry's influence extends globally, significantly contributing to economic prosperity by generating millions of jobs (Okosun *et al.*, 2021). According to Doyle (2019), the construction sector employed approximately 7.5 million individuals as of July 2019, with projections indicating an addition of 864,700 new jobs by 2026, corresponding to a growth rate of about 12%. Beyond its sheer size, the construction industry's relevance is underscored by its substantial contributions to other economic sectors (Diamini, 2012; Musarat & Ahad, 2016; Okosun *et al.*, 2021). However, Obiegbu (2003) notes that the inherent demand for substantial resources in construction projects renders quality susceptible to material price inflation. Ogun *et al.* (2014) indicate that construction materials can represent 35-45% of project costs, and in some scenarios, this figure could escalate

to 60%. Consequently, the Nigerian construction sector grapples with critical challenges, primarily inflation and construction quality. These challenges adversely affect not only the industry itself but also have broader implications for the national economy and its populace. The persistent inflationary environment in Nigeria particularly impacts the construction sector, leading to escalated costs for materials, labour, and equipment rentals. Such increases foster project delays, budget overruns, and a decline in construction quality (Oluwajana *et al.*, 2022). Consequently, real estate contractors often face considerable challenges in managing rising expenses, frequently compromising on quality to maintain profitability.

In this context, Okosun *et al.* (2021) argue that the significance of project quality is often underestimated, with insufficient emphasis placed on this key parameter within the industry. Quality remains a primary indicator of project outcomes, accentuating the necessity for implementing quality management practices to align construction projects with client specifications and standard codes. However, the ramifications of inflation on construction quality are starkly felt. Onashile (2008) points out that the Nigerian construction sector is navigating a turbulent landscape, where inflation and soaring material costs hinder projects that could enhance living standards, leading to either

¹ Corresponding Author

Email address: adamudeur@gmail.com

abandonment or stalling of prospective initiatives. Moreover, Oluwajana *et al.* (2022) further assert that building costs may surge by as much as 30% year-over-year due to inflation, compelling developers and builders to compromise on quality standards in response to persistent increases in material prices.

Okosun *et al.* (2021) also noted that in today's construction industry, there is evidence of an unpredictable market, inflation, price changes of building materials, and other effects of inflation, making it challenging to have high-quality construction projects. Hence, the expansion of the construction industry is significantly impeded by inflation and the proliferation of sub-standard structures. Based on the aforementioned, this study aims to look at the effect of inflation on the quality of construction projects in the Federal Capital Territory, Abuja, to enhance real estate construction as well as mitigate the effects of inflation on construction in Nigeria.

2. Literature Review

Inflation is defined as a period of consistently rising prices in an economy. Okosun *et al.* (2021) defined inflation as a widespread and continuous increase in prices of products. Economists use the term "inflation" to refer to a continuous increase in prices at the overall level expressed in monetary units. Accordingly, inflation is the result of an absolute decrease in purchasing power or money per unit, which is equivalent to a decline in the actual value of the unit of account and medium of exchange in an economy. The International Standard Organisation (ISO) defines quality as the full features and properties that fulfil stated needs (ISO, 2000). Therefore, project quality can be defined as either "meeting customer expectations" or "meeting customer specifications."

Quality attributes: Daniel (2024) describes quality attributes as the measures and methods related to a product or service. Key attributes include: (i) Functionality: The degree to which a product performs its intended function; (ii) Performance: How well it meets its intended use; (iii) Reliability: The ability to perform as intended without failures under normal conditions; (iv) Relevance: Meeting the actual needs of beneficiaries, being applicable and appropriate; (v) Timeliness: Delivery in time to address needs; (vi) Suitability: Fitness and correctness for the conditions of use; (vii) Completeness: Inclusion of the entire scope of services; (viii) Consistency: Uniform service delivery for all beneficiaries, ensuring standardised procedures.

Effect of inflation rate on construction projects: The impact of inflation on construction projects has been widely studied. Ogun *et al.* (2014) analysed construction material prices in Nigeria from 1998 to 2007 and found a third-order polynomial relationship with the cumulative inflation rate. Akanni *et al.* (2014)

conducted a survey in Lagos State, revealing significant effects of inflation on material prices. Alabi and Fapohunda (2021) noted that rising costs lead to instability in the industry, resulting in profit forecasting challenges and layoffs. Adu and Ekung (2019) identified inflation and other factors as primary causes of increased building material prices, leading to contractual claims and declining profit margins. Bello *et al.* (2020) found significant effects of inflation on residential property development in Bauchi, while (Otunola *et al.*, 2021) highlighted land acquisition and material costs hindering real estate development in Bariga, Lagos. In Ethiopia, Wondimagen and Essubalew (2022) noted poor risk management contributing to inflation in building materials, while Belay and Jain (2023) identified key factors affecting project costs in Adama, including fluctuating currency rates and supply-demand imbalances.

The study area (FCT, Abuja, Nigeria)

The Federal Capital Territory (FCT) Abuja is situated in the North-Central zone of Nigeria; Abuja is the capital of Nigeria's Federal Capital Territory (FCT). The FCT is around 8,000 square kilometres in area and shares borders to the North with Kaduna State, to the west with Niger State, to the east and southeast with Nasarawa State and the southwest with Kogi State (Okosun *et al.*, 2021).

3. Research Methodology

An exploratory research design was adopted for this study. Data were derived from both primary and secondary sources. The primary data includes individual interviews, postal questionnaires, street interviews, telephone interviews and direct observation. Secondary data were derived from the files and records of real estate construction, the NBS and the CBN. The research examines the rate of inflation, nature of project qualities and in FCT, Abuja, between 2019 and 2024 (6 years). To demonstrate a clear correlation between inflation and the quality of real estate construction, the duration was deemed sufficient due to the country's economic recession. The target populations were the Real Estate Developers (REDs) and the private land owners in FCT Abuja. The sample size of property owners in Abuja is 400. At the same time, due to the relatively small number of Real Estate Developers Association of Nigeria (REDAN) members in Abuja, a sampling frame of 150 was adopted as the sample size, as suggested by Israel (2002) for a population of less than 200. According to the National Directory of REDAN, FCT Abuja has about 1,700,000 housing units and over 150 REDAN in FCT, Abuja. Questionnaires were administered (Type A and Type B) to the property owners and the Real Estate Developers. The first section dealt with questions on the background and characteristics of the respondents and the sampled firms in terms of sex, age, office location, employment, year of establishment, etc.

In contrast, the second section sought to gather vital information about their perceptions on the subject matter of the effect of inflation on the quality of construction in Abuja. In all, 305 out of the 650 questionnaires were distributed to the target population, resulting in a 46.92% recovery rate. This indicates a low proportion of response, due to the difficulty in persuading, accessing and retrieving the questionnaires. Using stratified sampling techniques, structured questionnaires were administered and retrieved from 95 (63.33) REDs and 210 (52.50) Private Land Owners (Table 1). The descriptive analysis and inferential analysis methods were used. Data collected were analysed using descriptive statistics and the Weighted Mean Score.

the years. However, if adequate economic policies are not introduced to curb its effects on the economy, many existing real estate construction sectors will become moribund. This finding is corroborated by Okosun et al. (2021), who claimed that, irrespective of the prices of materials, Real Estate Developers and Property Owners are mainly concerned with profit-making in order to remain in business.

4.2. *Nature of project qualities within the selected period in the study area*

After analysing the opinions of Real Estate Developers and Property Owners in Abuja regarding key quality attributes, a Mann-Whitney U test was conducted within the selected period in the study area to identify

Table 1: Questionnaire administration schedule

Respondents	No Administered	No Retrieved	Percent
Real Estate Developers in Abuja	150	95	63.33
Private Land Owners in Abuja	400	210	52.50
Total	650	305	46.92

Source: Author's field survey (2024)

4. Findings and Discussion

The findings of the inflation and quality attributes in construction projects in the Federal Capital Territory (FCT), Abuja, Nigeria, are presented below;

4.1. *The rate of inflation between 2019 and 2024 in the FCT, Abuja*

Relative to the inflation rate in the economy (Table 2), data derived from the Nigerian Bureau of Statistics (NBS) revealed that the inflation rate in 2019 dropped to 11.40% and further increased to 13.25% in 2020 due to economic fluctuations. However, the impact of the COVID-19 pandemic further affected the level of inflation. It increased the prices of goods and services when the inflation rate rose to 13.25%, indicating a 1.85% increment from the previous year. Furthermore, the inflation rate increases to 16.95% in 2021 and 18.85% in 2022. As a result of the inadequate balance in the economy, the inflation rate in 2023 increased to 24.66% representing a 5.81% increment in the rate of inflation. As of mid-2024, the rate of inflation in Nigeria stood at 26.31% which caused significant increases in the price of goods and services and had a subsequent effect on the real estate construction sector. Thus, the rate of inflation and the rate of annual Change in the rate of inflation over the years show inflation is associated with increases and decreases in prices over

any differences among respondents. Eight main factors were carefully examined and analysed, namely functionality, performance, reliability, relevance, timeliness, suitability, completeness, and consistency. Results showed significant aspects of project qualities and the differing perspectives of Real Estate Developers and Owners/Occupants in FCT Abuja, as detailed in Table 3 (Appendix 1). The primary quality attributes identified in the study were sustainability, strength, and performance of structures, ranked 1st and 2nd respectively, with mean scores of 4.7368. Ease of use, indoor air quality, and functionality of building systems ranked 3rd to 5th with mean scores of 4.7158 and 4.6211. In terms of timeliness, the period of construction ranked 1st (4.7263), followed by feedback (2nd, 4.1684) and maintenance policy timing (4th, 3.8526).

For suitability attributes among Real Estate Developers in Abuja, meeting requirements topped the list (4.6737), followed by proper handling (2nd, 4.4947) and desirability/demand (3rd, 4.3474). Conformity to international standards (4th, 3.8842) and capacity support (5th, 3.8526) were also noted. It could be deduced that, as presented in Table 3. Inconsistent quality elements, quality assurance was ranked 1st (4.4105), with project requirements (2nd, 4.3263) and financial accuracy (3rd, 4.1474) following. Building techniques and uniformity were 4th and 5th with mean

Table 2: The rate of inflation between 2019 and 2024

	2019	2020	2021	2022	2023	2024
Inflation (%)	11.40	13.25	16.95	18.85	24.66	26.31
Annual Change (%)	-0.70	1.85	3.71	1.89	5.81	1.65

Source: Bureau of Statistics (2024)

scores of 4.0737 and 4.0211. However, most of the sampled defects shows that there are significant differences in respondents opinions on the nature of project qualities with a significant level of lesser than 0.05($p \leq .05$). The finding is supported by Oluwajana *et al.* (2022), who indicated that inflation has an adverse effect on construction project attributes in Nigeria, which is against the expected outcome of the respondents. This implies that there are some somewhat significant differences in the response of the respondents based on the nature of project qualities within the selected period in the study area.

4.3. The extent to which inflation has affected project quality in FCT, Abuja

From Table 4, the relationship between inflation and project quality attributes showed both statistically significant and non-significant relationships. There are positive and negative relationships between inflation and project quality attributes in Abuja, as evidenced by the correlation coefficients, which have both positive and negative values.

As indicated in Table 4, inflation exhibits a correlation of -0.589 with functionality in terms of project quality. This negative relationship suggests that an increase in inflation corresponds to a decline in the functionality associated with the quality of real estate construction. Additionally, the analysis of other attributes reveals a mix of positive and negative correlations, indicating their varying impacts on project quality. The correlation coefficients for the majority of quality characteristics fall within the range of ± 0.41 to ± 0.70 . Therefore, the relationship between inflation and these quality characteristics is considered moderate. This suggests that inflation is not the sole factor influencing project quality.

5. Conclusions and further research

The study shows fluctuation in the rates of inflation in FCT Abuja, Nigeria. At the same time, the prices of building materials have continued to increase as a result of the high rates of inflation. The study concludes that, appropriate policy formulation as well as intervention strategies is essential; this includes the use of local building materials, appropriate budgeting inflation

Table 4: Extent to which inflation has affected project quality in FCT, Abuja

		Inflation	Functionality	Performance	Reliability	Relevance	Timeliness	Suitability	Completeness	Consistency
Inflation	Pearson Correlation	1								
	Sig. (2-tailed)									
	N	305								
Functionality	Pearson Correlation	-.589**	1							
	Sig. (2-tailed)	.001								
	N	305	305							
Performance	Pearson Correlation	-.640*	.531	1						
	Sig. (2-tailed)	.014	.585							
	N	305	305	305						
Reliability	Pearson Correlation	.454**	-.584**	-.507	1					
	Sig. (2-tailed)	.007	.001	.897						
	N	305	305	305	305					
Relevance	Pearson Correlation	.443*	-.564**	.450	.466**	1				
	Sig. (2-tailed)	.012	.004	.388	.004					
	N	305	305	305	305	305				
Timeliness	Pearson Correlation	.662**	-.681**	-.559	.477	.524**	1			
	Sig. (2-tailed)	.005	.002	.303	.181	.000				
	N	305	305	305	305	305	305			
Suitability	Pearson Correlation	.534*	.519	.550	-.439*	.131*	.531	1		
	Sig. (2-tailed)	.019	.744	.382	.015	.422	.591			
	N	305	305	305	305	305	305	305		
Completeness	Pearson Correlation	-.634*	.490	-.502	-.576**	.458	-.517*	.553	1	
	Sig. (2-tailed)	.019	.117	.966	.002	.315	.042	.354		
	N	305	305	305	305	305	305	305	305	
Consistency	Pearson Correlation	.537*	-.559**	.591	.515**	.474**	.482	-.403	-.460	1
	Sig. (2-tailed)	.017	.005	.114	.000	.002	.152	.959	.296	
	N	305	305	305	305	305	305	305	305	305

** . Correlation is significant at the 0.01 level (-2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source: Author's field survey, 2024

reduction measures as this will help enhance real estate development and investment in the country. Ultimately, the construction industry, private developers, governmental organisations, and corporate bodies will all greatly profit from the study, as it will also function as a manual and source of information for further studies and researchers who may undertake research work on a similar subject. Given the foregoing, the study conclude that, the Government should look into the creation of favourable policies that will reduce the rate of inflation as well as its subsequent effects on the prices of building materials; Furthermore, The Government and relevant stakeholders should reduce the inflation on the prices of building materials, support

References

- Otunola, Abulakeem. O., Hadiza, A. M., & Yusuf, G. L. (2021). The effects of rising costs of building materials on property development in Bariga area of Lagos State. *International Journal of Environmental Design & Construction Management*, 20(4), 287–306.
- Akanni, P. O., Oke, E. A., and Akpomiemie, O. A. (2014). Impact of environmental factors on building project performance in Delta State, Nigeria. *HBRC Journal. Advance online publication*. doi:10.1016/j.hbrej.2014.02.010.
- Akanni, P.O., Oke, E. A. and Omotilewa, O. J. (2014). The implications of rising cost of building materials in Lagos State, Nigeria. *SAGE Open*, Pp 1–7.
- Alabi, B., and Fapohunda, J. (2021). Effects of increase in the cost of building materials on the delivery of affordable housing in South Africa. *Sustainability*, 13(4), 1772.
- Alaloul WS, Liew MS, Zawawi NAW, Mohammed BS, Adamu M, Musharat MA. Structural equation modelling of construction project performance based on coordination factors. *Cogent Eng* 2020;7(1):1726069.
- American Society for Quality (2022): Quality and attributes to the required standard, USA.
- Belay, Y. and Jain, D. (2023). Assessing the effects of price escalation on building construction projects in Adama, Ethiopia. *American Journal of Management Science and Engineering*. 8(2), , pp. 56-62. doi: 10.11648/j.ajmse.20230802.13
- Bello, H. T., Mohammed, M. I., Muhammad, M. S. and Adekunle, U. (2020). Effects of inflation on residential property development in Bauchi Metropolis. *Science Arena*
- and encourage innovative research in the development of new local building materials for production; government should take drastic measures to counter the problem of transportation costs, cost of power supply, and the increase in fuel prices in order to improve the ease of movement and distribution of raw materials to the factory (distribution of the finished products from the factory to the end-user) and finally, the study conclude that, there should be a shift from over-dependency on imported materials to the use of local materials. Further research should be carried out on the performance attributes of major quality attributes in building constructions in Abuja.
- Central Bank of Nigeria. (1996). Inflation in Nigeria. *Central Bank of Nigeria Briefs, Research Department*. No 96/11. Abuja, Nigeria. Government Printing Office.
- Central Bank of Nigeria. (2002). *The changing structure of the Nigerian economy and implication for development*. Abuja, Nigeria. Research department.
- Daniel, A. (2024). Project Quality and Risk Management. *Sources of Quality Definition , Quality Characteristics, Lecture Notes*.
- Diamini S. (2012). Relationship of construction sector to economic growth. *Paper presented at the International Congress on Construction Management, Canada, 2012*.
- Doyle A. (2019). Construction careers: options, job titles, and descriptions. Retrieved from <https://www.thebalancecareers.com/construction-job-titles-2061492>, 2019.
- Iyoha, M.A., Oyofusi, S.A., and Oriakhi, D.E. (2003). *An introduction to modern macroeconomics*. Benin City: Mindx Publishing.
- John-Nwagwu, H.O., Okosun, S.E. (2021): Impact of rainfall on the flood menace of the Federal Capital Territory of Nigeria. *Making Cities and Human Settlements Inclusive, Safe, Resilient, and Sustainable*. Pp 667–682.
- Musarat, MA, Ahad, M. Z. (2016). Factors affecting the success of construction projects in Khyber Pakhtunkhwa, Pakistan. *J Construct Eng Project Manage* 6 (4).1–6.
- Musarat, M. A. Alaloul, W. S. and Liew, M. S. (2020). Impact of inflation rate on construction projects: *Ain Shams Engineering Journal* 12 (21) 407–414
- Obiegbu, M.E. (2003). *Effective project delivery in the Nigerian construction industry: Effective building procurement and delivery in the Nigerian*

- construction industry*. Anambra: Rex Charles and Patrick Ltd.
- Ogun, O., Ogunsina, O. and Ugochukwu, S.C. (2014). An assessment of the impact of inflation on construction material prices in Nigeria. *PM World Journal*, 3(4) 1-22
- Okosun, S.E.; Oluwajana, S.M.; Johnson, N.G.; Abel, O.A.; and Olowookere, C.A (2021). Time and cost model for road construction project in Nigeria. *Sustainable Education and Development*. Pp 109–119.
- Oluwajana, S.M., Ukoje, J.E., Okosun, S.E. and Aje, I.O. (2022): Factors affecting time and cost performance of road construction projects in Nigeria. *African Journal of Applied Research, University of Ghana, Accra, Ghana*, 8(1), Pp. 72-84.
- Onashile, O. (2008, June 11). Construction costs have increased by over 30% in Nigeria. *Vanguard*. Retrieved from <http://www.vanguardngr.com/content/view/21943/143/>.
- Umaru, A. and Zubairu, A. A. (2012). Effect of inflation on the growth and development of the Nigerian Economy. *International Journal of Business and Social Science*. 3(10)Pp 183-191.
- Wondimagen, T. B. and Essubalew, T. Y. (2022). The impact of cost inflation on building construction materials in Wolaita Zone, Southern Ethiopia. *Journal of University of Shanghai for Science and Technology* 24(1), 339-345.

Appendix 1

Table 3: Nature of project qualities within the selected period in the study area

Nature of project qualities	REDAN Members		Property Owners		Mann-Whitney U				Kendall's Tau_b	Sig.
Functionality	Mean	Rank	Mean	Rank	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)		
Strength and Performance	4.7368	2 nd	4.6286	2 nd	8899.00	31054.00	-1.851	.064	1.00	
Dwelling	4.4421	6 th	4.4190	4 th	9282.00	31437.00	-1.132	.258	-.046	.425
Durability	4.3053	7 th	4.2952	5 th	9480.50	31635.50	-.791	.429	-.243	.000
Sustainability	4.9684	1 st	4.5476	3 rd	6849.00	29004.00	-5.840	.000	.202	.000
Extent of Usage	3.2632	10 th	3.7190	9 th	7679.50	12239.50	-3.331	.001	.056	.328
Maintenance	3.4737	9 th	4.0381	6 th	7052.00	11612.00	-4.312	.000	-.021	.717
Aesthetic perception	3.8211	8 th	3.7857	8 th	9867.00	32022.00	-.158	.874	.327	.000
Project Ease of Use	4.5684	3 rd	4.6714	1 st	8916.00	13476.00	-1.821	.069	-.133	.020
Indoor Air Quality	4.7158	4 th	3.7000	10 th	5303.50	27458.50	-7.008	.000	-.101	.079
Building System Functionality	4.6211	5 th	3.9429	7 th	5790.00	27945.00	-6.279	.000	-.008	.886
Performance										
Cost	4.1684	9 th	4.2571	3 rd	9633.00	14193.00	-.519	.604	1.00	
Capacity	4.4947	5 th	3.5857	10 th	5368.00	27523.00	-6.749	.000	-.204	.000
Serviceability	4.2632	6 th	3.7286	8 th	6825.00	28980.00	-4.641	.000	-.230	.000
Convenience	4.2632	6 th	4.3286	2 nd	9130.00	13690.00	-1.314	.189	-.111	.033
Accuracy	3.8632	10 th	3.6762	9 th	8820.50	30975.50	-1.690	.091	-.326	.000
Robustness	4.7579	1 st	4.0857	7 th	6145.50	28300.50	-5.942	.000	-.146	.004
Resilience	4.6526	3 rd	4.1762	6 th	7241.50	29396.50	-4.223	.000	-.201	.000

Comfort	4.5158	4 th	4.2190	5 th	8430.00	30585.00	- 2.366	.018	-.229	.000
Safety	4.1789	8 th	4.2476	4 th	9098.00	13658.00	- 1.333	.183	.066	.198
Energy Efficient	4.7053	2 nd	4.3714	1 st	7572.00	29727.00	- 3.829	.000	.066	.213
Reliability										
Specific function	4.7474	1 st	3.5048	10 th	2756.00	24911.00	- 10.59 4	.000	1.00	
Cost of Rework	3.9789	9 th	3.6905	9 th	7721.50	29876.50	- 3.334	.001	.248	.000
Failure Cost	4.6737	3 rd	4.5095	4 th	9177.00	31332.00	- 1.357	.175	.057	.265
Prevention Cost	4.2842	6 th	4.1143	7 th	9093.00	31248.00	- 1.346	.178	.304	.000
Project Delivery	4.1895	7 th	4.6095	1 st	7833.00	12393.00	- 3.561	.000	-.143	.005
Design	4.4947	2 nd	3.6524	8 th	4838.00	26993.00	- 7.568	.000	.458	.000
Operation and Maintenance	4.4632	4 th	4.5143	3 rd	9648.00	31803.00	-.557	.577	.103	.043
Installation of Components	4.4316	5 th	4.3857	5 th	8827.00	30982.00	- 1.819	.069	.066	.199
specific stability	4.0526	8 th	4.5810	2 nd	7324.00	11884.00	- 4.291	.000	.071	.158
flexibility of work	2.6316	10 th	4.2762	6 th	2943.50	7503.50	- 10.31 6	.000	-.388	.000
Relevance										
Cost of Maintenance	4.4526	1 st	4.4857	1 st	9595.00	31750.00	-.620	.535	1.00	
Ease of Servicing	4.2947	2 nd	4.1238	4 th	9316.00	31471.00	- 1.001	.317	.413	.000
Ease of Management and Maintenance	3.9789	6 th	4.3619	3 rd	8281.00	12841.00	- 2.594	.009	.166	.001
Project Reliability	4.0632	4 th	3.8714	6 th	9176.00	31331.00	- 1.183	.237	.295	.000
Continuous Service	3.7684	10 th	4.1048	5 th	8323.00	12883.00	- 2.479	.013	.296	.000
Ease of Project Delivery	3.9474	8 th	3.0095	10 th	5682.00	27837.00	- 6.183	.000	.109	.028

Project Cost Estimates	3.9789	6 th	3.5524	9 th	7265.50	29420.50	- 4.007	.000	.157	.002
Project Schedule	3.8842	9 th	4.4190	2 nd	7062.00	11622.00	- 4.451	.000	.098	.059
Project Delivery Date	4.0211	5 th	3.5524	8 th	7495.50	29650.50	- 3.634	.000	.190	.000
Costs of Materials	4.0737	3 rd	3.8571	7 th	8678.50	30833.50	- 1.910	.056	.149	.003
Timeliness										
Construction Period	3.8211	5 th	4.2571	4 th	8115.00	12675.00	- 2.800	.005	1.00	
Project Timeline	3.2526	10 th	3.4667	10 th	8787.00	13347.00	- 1.763	.078	-.011	.829
Project Delivery	3.7474	7 th	3.5238	8 th	8504.00	30659.00	- 2.194	.028	.149	.003
Feedback	4.1684	2 nd	3.8048	6 th	7461.00	29616.00	- 3.765	.000	.046	.356
Time taken to Rectify Defects	3.2632	9 th	3.5476	9 th	8396.00	12956.00	- 2.344	.019	.098	.049
Maintenance Schedule	3.8737	3 rd	3.7238	7 th	9160.50	31315.50	- 1.239	.215	-.200	.000
Period of Construction	4.7263	1 st	4.3810	2 nd	7811.50	29966.50	- 3.500	.000	-.271	.000
Duration of the schedule	3.4211	8 th	3.8429	5 th	7666.50	12226.50	- 3.372	.001	-.102	.038
Maintenance policy and timing	3.8526	4 th	4.2619	3 rd	7274.50	11834.50	- 4.035	.000	-.137	.007
Repair Functions and Services	3.7895	6 th	4.5762	1 st	4715.00	9275.00	- 8.208	.000	.075	.141
Suitability										
Optimal Use	3.2526	9 th	4.1286	7 th	5144.00	9704.00	- 7.075	.000	1.00	
Capacity Support	3.8526	5 th	3.8000	9 th	9142.50	13702.50	- 1.228	.219	-.164	.001
Building Features	3.5368	7 th	3.4619	10 th	9490.50	31645.50	-.702	.483	.307	.000
Client Satisfaction	3.4526	8 th	4.6381	2 nd	3302.00	7862.00	- 10.33 7	.000	.217	.000

Conformity to International Standards	3.8842	4 th	4.7571	1 st	3729.00	8289.00	- 10.00 9	.000	.331	.000
Meeting Requirements	4.6737	1 st	4.6048	3 rd	9608.50	31763.50	-.629	.529	.232	.000
Fitness for Purpose	3.0737	10 th	4.5429	4 th	2495.00	7055.00	- 11.27 2	.000	.263	.000
Handling	4.4947	2 nd	4.3667	5 th	9716.50	31871.50	-.411	.681	.098	.054
Strenght	3.5579	6 th	4.1286	7 th	6635.50	11195.50	- 4.922	.000	-.064	.194
Desirability and Demand	4.3474	3 rd	4.2095	6 th	9326.00	31481.00	-.991	.322	.042	.409
Completeness										
Specification Requirement	4.2737	9 th	3.8905	6 th	8256.00	30411.00	- 2.587	.010	1.00	
Minimal Absence of Deficiency	4.2526	10 th	4.3286	2 nd	9509.50	14069.50	-.720	.472	.252	.000
Report of Claims	4.8632	1 st	3.7190	9 th	5195.50	27350.50	- 7.456	.000	-.145	.004
Minimal Absence of Rework	4.3579	7 th	4.0952	4 th	8503.00	30658.00	- 2.283	.022	-.018	.724
Compliance	4.8211	2 nd	4.6762	1 st	8901.00	31056.00	- 2.116	.034	.028	.600
Consistency	4.5579	3 rd	3.7952	7 th	6480.00	28635.00	- 5.377	.000	-.069	.169
Usability	4.4526	5 th	3.7286	8 th	5016.00	27171.00	- 7.374	.000	-.099	.047
Accurate	4.4947	4 th	4.2429	3 rd	6612.50	28767.50	- 5.207	.000	.112	.028
Project Delivery	4.3684	6 th	3.4190	10 th	4424.00	26579.00	- 8.137	.000	.155	.002
Materials and Deliverables	4.3474	8 th	3.9000	5 th	6979.00	29134.00	- 4.456	.000	-.091	.066
Consistency										
Project Components	3.8842	8 th	4.1381	6 th	9899.00	14459.00	-.115	.909	1.00	
Desired Specification	3.1158	10 th	3.9571	7 th	6153.50	10713.50	- 5.567	.000	.464	.000
Quality Assurance	4.4105	1 st	3.8905	9 th	6802.50	28957.50	- 4.723	.000	.153	.002
Project Required	4.3263	2 nd	4.3524	3 rd	9601.50	14161.50	-.588	.556	.208	.000
Uniformity	4.0211	5 th	3.4714	10 th	6920.50	29057.50	- 4.441	.000	.390	.000

Financial Accuracy	4.1474	3 rd	4.2905	5 th	9404.50	13694.50	-.874	.382	.491	.000
Fluidity of Concrete	3.8105	9 th	4.6905	2 nd	5541.50	10101.50	- 7.218	.000	-.008	.871
Confidence	3.9895	6 th	4.3524	3 rd	8132.00	12692.00	- 2.871	.004	.297	.000
Building Techniques and Practices	4.0737	4 th	4.8095	1 st	5135.00	9695.00	- 8.232	.000	.096	.064
Right Mix and Proportions	3.9368	7 th	3.9381	8 th	9897.00	32052.00	-.115	.908	.340	.000

Source: Field Survey (2024)