

Developing Infrastructure in Nigeria: Why is the Cost so High?

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Abstract *The total cost of infrastructure in normal circumstances is expected to be the sum of the cost of materials, labor, site overheads, equipment/plant, head office cost and profit but in many parts of the world particularly in Nigeria, there are other costs to be allowed for. This study seeks to investigate and report the other costs to be allowed for, which are the reasons why the cost of infrastructure is so high. A sample of 70 respondents comprising of construction clients, consultants and contractors were randomly selected and data were gathered using a set of questionnaire to identify the reasons for high cost of infrastructure. Spear man rank order correlation was used to analyze the study hypothesis. The findings revealed cost of materials, incorrect planning, wrong method of estimation, contract management and fluctuation of material prices as the five most important factors affecting cost of infrastructure. It was also found that construction clients, consultants and contractors do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria. While it is recommended that the government should develop adequate frameworks for monitoring and controlling cost of infrastructure, consultants especially cost experts should ensure that they make use of accurate estimating methods and that contractors should employ adequate planning and scheduling techniques because proper planning and scheduling is the key to utilizing project resources and minimizing wastes.*

Keywords: *cost, consultants, contractors, infrastructure, Nigeria,*

1. Background of the study

The global construction industry is facing a great challenge to cut cost. This is because of the reports of escalating costs of construction of all types all over the world.

Furthermore, the dwindling economic fortunes of nations around the world have geared up participants in the construction sectors (the client in particular) to take up the challenge of ensuring efficient use of their resources to obtain value for money in terms of performance (Mendelson and Greenfield, 1996).

In Nigeria, the problem of high construction cost is becoming obvious (Okpala and Aniekwu, 1988; Elinwa and Buba, 1999, Omoregie and Radford, 2006). Consequently, substantial increases are being observed in projects. This substantial increases has negative implications for the major stake holders in the industry including loss of client confidence in consultants, added investment risks, inability to deliver value to clients, and disinvestment in the construction industry; thereby undermining the industry's viability and sustainability (Mbachu and Nkado, 2004).

The total cost of infrastructure in normal circumstances is expected to be the sum of the following cost: materials, labor, site overheads, equipment/plant, head office cost and profit but in many parts of the world particularly in Nigeria, there are other costs to be allowed for. This study seeks to investigate and report the other costs to be allowed for, which are the basic reasons why cost of infrastructure is relatively high in Nigeria. The study aims at answering the following research questions:

- What are the main factors affecting cost of infrastructure in Nigeria?
- What is the severity rank of the factors affecting cost of infrastructure amongst clients, consultants and contractors?

It also seeks to analyze the hypotheses:

H1: Contractors and Clients do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria.

H2: Clients and Consultants do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria.

H3: Consultants and Contractors do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria.

2. Review of related works

2.1. Construction cost factors

Although cost is a major determinant of project success, most infrastructure projects exceed their initial cost of construction. Several factors have been reported in the literature as affecting cost of infrastructure. Frimpong, Oluwole and Crawford (2003) reported that payment difficulties, poor contractor management, material procurement, poor technical performances and escalation of material prices were the main factors causing delays and cost overruns in construction of ground water projects in Ghana.

Memon, Rahman and Abdul - Azis (2011) revealed poor design, unrealistic contract duration, lack of experience, inadequate planning and scheduling, poor site management and supervision and mistakes during construction as the most significant factors leading to construction cost overruns.

In Nepal, monopoly control of the market by some suppliers, work stoppages in factories, lack of industrialized materials, fluctuating demands forcing suppliers to wait for accumulation of orders and difficulty in importing raw materials from other countries are the main factors affecting cost of construction (Manavazhi and Adhikari, 2002).

In a study of the Nigerian construction industry, Omoregie and Radford (2006) sampled the opinions of Contractors, Consultants and Clients and they discovered 15 factors responsible for project delays and construction cost escalation. Price fluctuation was revealed as the most severe cause of project cost escalation. Ogunlana et al (1996) reported that the mode of financing and payment of completed works is also responsible for cost escalation in Nigeria. Moreover, government deregulation policies aimed at liberalizing the economy since 1986 contributes significantly to additional cost of construction (Aibinu and Jagboro, 2002).

40 factors affecting cost of infrastructure were identified from the literature. See table 1

Table 1: Construction cost factors

Construction cost factors	References
1.Absence of construction cost data	Elinwa and Silas (1993) AL- Khaldi (1990)
2.Additional work	Mansfield,Ugwu and Doran (1994) Elinwa and Silas (1993)
3.Bureaucy in tendering method	Elinwa and Silas (1993)
4. Contractor's cartel	Omole (1986)
5.Contract management	Mansfield ,Ugwu and Doran(1994) Ogunlana, Krit and Vithool (1996)
6.Contractual procedures	Elinwa and Silas (1993) AL- Khaldi (1990)
7. Cost of materials	Elinwa and Silas (1993)
8.Currency exchange	AL- Khaldi (1990)
9.Disputes on site	Aibinu and Jagboro (2002)
10.Duration of contract period	Aibinu and Jagboro (2002)
11.Economic stability	Elinwa and Silas (1993)
12.Fluctuation of prices of materials	Omoregie and Radford (2005)

13. Fraudulent practices and kickbacks	Hussain (1999), TELL (2002)
14. Frequent design changes	Asamoah (2002)
15. Government policies	Omole (1986)
16. High cost of labor	Elinwa and Silas (1993)
17. High cost of machinery	Elinwa and Silas (1993)
18. High cost of machinery maintenance	AL- Khaldi (1990)
19. High cost of transportation	Elinwa and Silas (1993)
20. High interest rates charged by banks	AL- Khaldi (1990)
21. Inadequate labor availability	Elinwa and Silas (1993) AL- Khaldi (1990)
22. Inadequate production of raw materials	Eyo – Ita – Eyo (2001)
23. Incorrect Planning	Elinwa and Silas (1993)
24. Insurance cost	AL- Khaldi (1990)
25. Labour nationality	AL- Khaldi (1990)
26. Lack of coordination between designers and contractors	AL- Khaldi (1990)
27. Lack of productivity standard	AL- Khaldi (1990)
28. Level of competitors	AL- Khaldi (1990)
29. Long period between design and tendering time	Elinwa and Silas (1993)
30. Mode of financing bond and payments	Frimpong Oluwoye and Crawford (2003)
31. Number of competitors	AL- Khaldi (1990)
32. Number of construction going on at the same time	Elinwa and Silas (1993)
33. Previous experience of contractor	AL- Khaldi (1990)
34. Political interferences	Omole (1986)
35. Poor financial control on site	Ogunlana, Krit and Vithool (1996)
36. Relationship between management and labour	Elinwa and Silas (1993)
37. Social and cultural impacts	AL- Khaldi (1990)
38. Supplier and cultural impacts	Manavazhi and Adhikari (2002)
39. Supplier manipulation	Elinwa and Silas 1993)
40. Wrong method of estimation	Mansfield ,Ugwu and Doran (1994)

3. Methodology

The study utilized a descriptive survey design. The sample was made up of 70 respondents comprising construction clients, consultants and contractors. Respondents were randomly selected and data were gathered using a set of questionnaire to determine the main factors affecting cost of infrastructure in Nigeria. The measurement of items in the survey questionnaire was based on a 5 point Likert scale with 1 representing "Not severe effect" and 5 representing "Extremely severe effect". The collected data were analyzed using the IBM SPSS statistics.

Table 2. Response Rate

	Clients	Consultants	Contractors	Total
No. Distributed	16	22	32	70
No. Received	9	15	28	52
Percentage	56.25%	68.18%	87.5%	74.29%

N = 70

3.1 Data Analysis

The hypotheses were tested using Spear man rank order correlation with a confidence level of 95% (0.05).

3.2 Results

Table 3 shows that cost of materials (3.90), incorrect planning (3.73), wrong method of estimation (3.23), contract management (3.00) and fluctuation of prices of materials (2.75) are the five most important factors affecting cost of construction.

Table 3 Main factors affecting cost of infrastructure in Nigeria

S/N	FACTOR	N	MEAN	RANK
	Cost of materials	52	3.90	1
	Incorrect planning	52	3.73	2
	Wrong method of estimation	52	3.23	3
	Contract management	52	3.00	4
	Fluctuation of prices of materials	52	2.75	5
	Previous experience of contractor	52	2.75	5
	Absence of construction cost data	52	2.73	7
	Additional cost	52	2.60	8
	Project financing	52	2.56	9
	High cost of transportation	52	2.54	10
	Poor financial control on site	52	2.52	11
	Economic stability	52	2.50	12
	Fraudulent practices and kickbacks	52	2.44	13
	Inadequate labor availability	52	2.44	13
	High cost of machinery	52	2.42	15
	Inadequate production of raw materials	52	2.40	16
	Contractual procedures	52	2.40	16
	High cost of machinery maintenance	52	2.40	18
	Bureaucracy in tendering method	52	2.38	19
	Duration of contract period	52	2.37	20
	Supplier manipulation	52	2.37	20
	Disputes on site	52	2.35	22
	High cost of labor	52	2.33	23
	Government policies	52	2.27	24
	Relationship between management and labor	52	2.19	25
	Currency exchange	52	2.19	25
	Frequent design changes	52	2.17	27
	High interest rate charged by banks	52	2.17	27
	Social and cultural impacts	52	2.13	29
	Lack of coordination between designers and contractors	52	2.13	29
	Long period between design and tendering time	52	2.08	31
	Contractor's cartel	52	2.04	32
	Model of financing bond and payments political interferences	52	1.92	33
	Number of competitors	52	1.87	34
	Lack of productivity standard	52	1.86	36
	Number of construction going on at then same time	52	1.79	37
	Level of competitors	52	1.71	38
	Insurance cost	52	1.71	38
	Labor nationality	52	1.50	40

Valid N (list wise)

Table 4 reveals 15 most important factors affecting cost of infrastructure as perceived by clients, consultants and contractors. Clients, consultants and contractors rank cost of materials (3.67, 4.00, and 4.00 respectively) as the most important factor affecting cost of construction. Clients and contractors ranked incorrect planning (3.44, 3.89 respectively) as the second most important factor affecting construction cost. Consultants ranked wrong method of estimation (3.73) as the second most important factor. There was also a difference in the third most important factor as perceived by the three parties. It was poor financial control on site (3.33), incorrect planning (3.47) and contract management (3.54). When the overall averages of the groups were taken, cost of materials came first followed by incorrect planning and wrong method of estimation.

Table 4. Mean score and rank for the 15 most important factors affecting cost of infrastructure as reported by the different groups.

S/N	Factors affecting construction cost	Average		Client		Consultant		Contractor	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	Cost of materials	3.90	1	3.67	1	4.00	1	4.00	1
2	Incorrect planning	3.73	2	3.44	2	3.47	3	3.89	2
3	Wrong method of estimation	3.23	3	2.56	6	3.73	2	3.25	4
4	Contract management	3.00	4	2.56	6	3.13	4	3.54	3
5	Fluctuation of prices of materials	2.75	5	2.78	5	3.07	6	2.93	6
6	Previous experience of contractor	2.75	5	3.22	4	2.60	9	3.07	5
7	Absence of construction cost data	2.73	7	2.33	8	3.13	4	2.61	15
8	Additional cost	2.60	8	2.33	8	2.73	7	2.86	8
9	Frequent design change	2.56	9	2.11	13	2.60	9	2.86	8
10	Inadequate raw materials	2.54	10	2.33	8	2.27	14	2.68	12
11	Poor financial control on site	2.52	11	3.33	3	2.53	11	2.79	11
12	Economic stability	2.50	12	2.33	8	2.33	13	2.82	10
13	Fraudulent practices and kick backs	2.44	13	2.11	13	2.40	12	2.89	7
14	Supplier manipulation	2.44	13	2.11	13	2.27	14	2.64	14
15	Currency exchange	2.42	15	2.22	12	2.68	8	2.68	12

The hypotheses was set up to test if there is any agreement on the severity rank of the factors affecting cost of infrastructure in Nigeria as opined by the different groups. Table 5 shows the result of the computation of Spearman's rank correlation coefficient, the t- values, and null hypotheses for the severity rank of the factors affecting cost of infrastructure in Nigeria by the different groups in the construction industry.

Table 5. Test of agreement on the severity rank of the factors affecting cost of infrastructure

S/N	Stakeholder	Rs	t – cal	t - tab	Accept H0
1	Contractors/Clients	0.46	2.38	1.38	Accept
2	Clients/Consultants	0.36	1.73	1.38	Accept
3	Consultants/Contractors	0.59	3.29	1.38	Accept

Rs - Spearman rank order correlation, T – cal t – calculated, T – tab t – tabulated, Ho - null hypotheses.

4. Discussion of Findings

The most important factor affecting cost of infrastructure as opined by clients, consultants and contractors is cost of materials (see table 3). This is in consonance with the findings of Abdulaziz and Al – Juwairah (2002) where cost of materials was found to be the most significant factor contributing to construction cost in Saudi Arabia. Cost of construction material is high in Nigeria. This may be because Nigeria still has challenges especially with power. As a result, the building material industry is grounded and the few building material companies available are not running at full capacity. This results in shortages and affects material planning and coordination (Ogunlana, Krit and Vithool, 1996) which ultimately affects construction cost.

The second most important factor affecting cost of infrastructure in Nigeria is incorrect planning. This result is similar to those of Menon, Rahman and Abdul-Aziz (2011) who discovered that inadequate planning and scheduling contributes significantly to construction cost overruns in Malaysia.

Wrong method of estimation and poor contract management were found to be the third and fourth most important factors affecting cost of infrastructure in Nigeria. Mansfield, Ugwu and Doran (1994) reported that wrong method of estimation and poor contract management were also responsible for cost overruns in Nigerian construction projects.

The fifth most important factor affecting cost of infrastructure as discovered in this study was fluctuation of prices of material. This result bears some semblance with the findings of Omoregie and Radford (2006) who revealed price fluctuation as a severe cause of project cost escalation in Nigeria. (See table 2 for results)

Table 5 reveals the test results for the agreement on the severity rank of the factors affecting cost of infrastructure. Since T – cal 2.38, 1.73, 3.29 is greater than t – tab of 1.38 at $p < 0.05$, there is sufficient information to accept hypothesis:

H1: Contractors and Clients do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria

H2: Clients and Consultants do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria

H3: Consultants and Contractors do not generally agree on the severity rank of the factors affecting cost of infrastructure in Nigeria

Although the three parties do not generally agree in the ranking order of factors affecting cost of infrastructure, there is a higher agreement between contractors and consultants than between the others. This result is at variance with the findings of Abdulaziz and Al – Juwairah (2002) who found that there is a greater agreement between clients and contractors on the factors affecting cost of infrastructure.

5. Conclusion

Since the main factor affecting cost of infrastructure in Nigeria is cost of materials. It is suggested that the government should develop adequate frameworks for improving power so that the construction materials industry can thrive and the cost of materials can be scaled down. The government should influence the fiscal policies so that prices of materials can be relatively stable.

Moreover, contractors should use adequate planning and scheduling techniques because as Fisk (1999) noted proper scheduling is the key to utilizing project resources, if not, the project cost will increase. In addition, Quantity Surveyors should ensure that proper estimation methods are used for preparing estimates and updated price information is used to avoid mistakes. Lastly, contractors should improve on contract management practices because it has been observed that most contractors in Sub – Saharan Africa lack management skills and have less regard for contract plans, cost control and resource allocation (Frimpong, Oluwole and Crawford, 2003).

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