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Effect of Cash Flow on Contractors' Performance in Building Construction Projects in Niger State

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Abstract

Cash flow is the lifeblood of the construction industry; cash is the most important resource for a construction company, because more companies become financially ruined due to lack of fund for supporting their day-to-day activities. However, securing sufficient cash flow at all phases of construction project execution are the most challenging and chronic issues facing contractors. This implies that a study of the effect of cash flow on contractors' performance is still a gap which needs to be filled in order to link cash flow management with contractor' performance. Primary data were obtained from the Niger State Ministry of Works, Niger State Housing Corporation and Physical Planning and Development Unit, Federal University of Technology, Minna through a well-structured questionnaire distributed to 58 respondents with a response rate of 89.66%. Relative Importance Index (RII) and Mean Item Score (MIS) were employed for the analysis of data. The study found that improper planning and management is the most important factor affecting contractors' cash flow (RII = 0.91). Contractor experience was found to be the most important factor affecting contractors' performance (RII = 0.95). Timely completion of projects was discovered as the most significant effect of cash flow on contractors' performance (MIS = 4.83). Having appropriate planning was found to be the most effective strategy for improving contractors' performance. It was thus recommended that contractors' should always have appropriate plan and understand people's requirements and needs which will help and go a long way to improve their performance.

Keywords: Building, Cash flow, Construction projects, Contractors' performance.

INTRODUCTION

Construction projects such as buildings, highways, bridges, underground utilities, drainage facilities and industrial projects, among others are known for their high risk, complexity and uncertainty, particularly, at the cost estimate phase of such projects where the amount of project's information is very limited. As such contractors cannot survive in the competitive construction industry without effective cash flow management (Tarek and Yaqiong, 2014).

Securing sufficient cash flow at all phases of construction project execution is the most challenging and chronic issue facing contractors (Khalil *et al.*, 2012). Sufficient cash flow is absolutely necessary for three objectives; to pay for overhead, labour, and material expenses; to execute construction activities according to schedule; and to reduce financing liabilities (Khalil *et al.*, 2012). Studies have identified that lack of liquidity represents a major problem that leads to the failure of construction projects and bankruptcy of construction companies (El-Kholy, 2014). Tarek and Yaqiong (2014) stated that it is impossible for a contractor to survive

in the construction industry without proper cash flow management, as is the case for all industries as well as individual entities.

In addition, many authors have studied the causes of failure in construction industry (James, Weising and Thomas, 2010). Despite the considerable amount of literature existing on the problem of company failure due to poor management of cash flow in the construction industry and other erratic industries, challenges on implementing efficient cash flow continue to plague the construction industry (Ogawa, 2015). However, it can be understood that previous studies concentrated mainly on identification of the parameters for measuring contractors' performance and construction project performance. This implies that a study of the effect of cash flow on contractors' performance is still a gap which needs to be filled in order to link cash flow management with contractor' performance. In view of this, the study focused on investigating the effect of cash flow on contractors' performance. In order to achieve the aim, the study identified and examined the factors affecting contractors' cash flow; examined the factors that affect contractors' performance; established the effect of factors affecting contractors' cash flow on contractor' performance and suggested strategies for improving contractors' performance.

LITERATURE REVIEW

This section gives a review of relevant literature to the theme of the study. In the context of this study, "Cash Flow on Contractors' Performance" means how the circulation of cash affects contractors' performance in terms of Cost, Time and Quality.

Concept of Cash Flow

In very general terms, 'Cash Flow' is the movement of income into and expenditure out of a business (or other entity) over time (Brook, 2016). If more money is coming into the business than is going out of it, cash flow is said to be 'positive'. If more money is going out, this is negative cash flow (Brook, 2016). In construction, however, the term 'Cash Flow' typically refers to an analysis of when costs will be incurred and how much they will amount to during the life of a project (Brook, 2016).

The Importance of Cash Flow in Construction

The importance of steady fund income is crucial in construction projects; Cash flow can procure material, pay salaries, fund new projects, and finance other functions of the companies' day to day operations (Artan, 2018). Cash flow is also an issue for the construction supply chain and is a common reason for contractors and sub-contractors becoming insolvent, this can be extremely harmful for a project in terms of time and money (Artan, 2018). Companies themselves may be marginally profitable, but if there is not enough positive cash flow, a project might start failing because of the lack of consistent funds throughout the life of the project, therefore, Contractors must ensure that a payment schedule is agreed upon with the Owner for reliable cash flow projections (Artan, 2018).

Factors Affecting Contractors' Cash Flow

Tarek and Yaqiong (2014) have reported several factors that affect contractors' cash flow. These include: Change of progress payment duration, Change of progress payment condition, retention percent, Delay in releasing retention, Loan repayment, Payments of material (before after arrival), Over work measurement, Under work measurement, Change of labor and staff wages, Bank interest, Delay of making payments, Failure of sub-contractor, Poor design, Mistakes in executing the work, Lack of adequate insurance, Replacement of defective work, Project delayed, Material and equipment shortages, Lack of skilled labor, Improper planning and management, Contractor/owner disputes, Weather condition, Number of claims, Inability to manage change orders.

In a study conducted by Shalini (2015), it was reported that there are various factors which lead to cash flow problems. Some of the major problems according to Shalini (2015) include: Labor-intensive work, Payments to suppliers and subcontractors, Retainage, Slow paying customers, slow billing and unplanned cash expenditures.

In construction, more than 50 percent of project expenses are spent on materials, particularly for construction projects (Tarek and Yaqiong, 2014), with such an important proportion, it makes project cash outflow very sensitive to material cost fluctuation. It is reported that the usual delay of receiving payments is (30-45) days, which will greatly affect contractor's cash outflow (Tarek and Yaqiong, 2014).

Factors Affecting Contractors' Performance

The issue of shortening construction time, reducing cost and improving production performance has engaged both practitioners and researchers for a long time: the studies include motivation and productivity investigation as well as the analysis of planning and scheduling technique (Lee *et al.*, 2014). The contractors' satisfaction with the employer and consultants was tested with regard to overall performance, the quality of the tender documents and specifications, efficiency, openness and transparency of the contract procurement and the management of variation orders and claims (Lee *et al.*, 2014).

Raid and Yerevan (2018) discovered that a lot of factors influence the contractors' performance in the execution of construction projects. Among these strong factors that are commonly reported in the construction sources are: inappropriate management of time, contractors poor experience, injured workers, customers vacillations, repeated change-orders, imprecise estimation, insufficient planning and preparations, scheduling which is not regular, missing materials, non-payment of workers' wages, shortage of new equipment and technology, price fluctuations, labors scarcity, projects complexity, regulatory inadequacies, risk mismanagement, waste and unsuitable materials etc. Those factors are enlarged with negligible usage of construction projects management software and non-existence of all kinds' construction equipment's. The study of Raid and Yerevan (2018) revealed a variety of factors affecting contractors' performance. The factors are classified as: Contractors related factors, cost factor, time factor, quality factor and external factor.

Effect of Cash Flow on Contractors' Performance

Cash flow problems can be controlled if they are identified and addressed early. If ignored, they can result in increased interest expense, increased investment of owners' capital, reduced credit ratings, inability to take advantage of new opportunities and lastly, failure of the business (Nnadi *et al.*, 2017). Many companies delayed to engage in cash flow planning under the popular misconception that meaningful cash flow forecasts aren't possible, although it's not an exact science, proper cash flow planning can help a business make accurate decisions regarding budgeting, capital expenditures, financing, compensation and growth (Nnadi *et al.*, 2017).

Nnadi *et al.* (2017) had pointed out some effect of cash flow on contractors' performance which includes: Timely completion of projects, increase contractor profitability, regular payment for plant higher and acquisition, quality Project delivery, regular and prompt order of materials and reduction in the buying on credit by contractor. In another related study conducted by Ogunde, Odje, Gbemisola, Kunle, Olayinka, Sakariyau, Esoohe, and Hezekiah (2017), effects of cash flow on contractors' performance were revealed to be: Total abandonment, disputes, time overrun, cost overrun, arbitration, litigation, poor quality of end product, loss of productivity and efficiency, damage company reputation.

Strategies for Improving Contractors' Performance

Olanipekun *et al.* (2017) depicted the need for improvement in productivity/project delivery through the use of performance improvement measures. However, if the performance of Nigerian contractors in project must be improved, it is appropriate to seek for ways and factors to improve their performance in project execution. According to Babalola, Oluwaruyi, Akinloye and Aiyewalehinmi (2015), the factors contributing to improving the performance of contractors' in a construction projects was revealed, some of which are: Contractors progress payment on time, minimize change orders during construction to avoid delays, not bound to award the contract to the lowest bidder, but only to the proven contractor with the resource and skill, project team leader must be committed to his responsibilities and monitor the project progress closely especially on cost, time and quality.

Olanipekun *et al.* (2017) further established possible ways for improving contractors' performance in building construction projects which includes: having appropriate planning, good leadership, good communication, stakeholder relationship, taking accountability, timely documentation, comprehensive analysis, control and administrative system, understanding peoples requirements and needs, effective contractors and workers relationship, serviceability, employee empowerment, existence of key personnel, reliability, minimizing variation, conformance, hassle free building solution, less paper work.

The basis for contractors' performance according to Olanipekun *et al.* (2017) are that the project is completed on time, to the estimated budget, in the quality required, meets clients' satisfactions and needs, has happy stakeholders, exceed expectations, meet profits fee goals, satisfy all requirements of stakeholders and is completed safely, have no legal claims, minimizes an exasperated feeling of annoyance and have no conflict. This study also reveals

that criteria such as risk, conflict, and safety though usually excluded and deliver need to be taken into account

RESEARCH METHODOLOGY

The structured questionnaires employed to gather information for the study was designed using the five-point Likert's Scale format. RII and MIS were employed to analyse the data collected in order to achieve the research objectives. The use of RII and MIS for the analysis of data in this study is based on the formula depicted in Equation 3.1 and 3.2.

$$RII = \frac{\sum W}{4 \times N} \dots\dots\dots (3.1)$$

Where:

Σ = Summation, W = the weights of every one of the factors given by respondents and it was in the range of (1 - 5). (A=5) the largest value of weight (i.e Highest factor) and finally N refers to the Total number respondents.

$$MIS = \frac{\sum W}{N} \dots\dots\dots (3.2)$$

Where: Σ = Summation, W = Weight, and N = Total number respondents

The decision rule employed for the RII and MIS analysis is summarized in Table 1.

Table 1. Decision Rule for Data Analysis

SCALE	Cut-Off Point		Interpretation			
	RII	MIS	Frequency of Occurrence	Level of Importance	Level of Significance	Level of Effectiveness
5	0.81 - 1.00	4.51 - 5.00	Very Often	Very Important	Very Significant	Very Effective
4	0.61 - 0.80	3.51 - 4.50	Often	Important	Significant	Effective
3	0.41 - 0.60	2.51 - 3.50	Fairly Often	Fairly Important	Fairly Significant	Fairly Effective
2	0.21 - 0.40	1.51 - 2.50	Less Often	Less Important	Less Significant	Less Effective
1	0.00 - 0.20	1.00 - 1.50	Rarely	Least Important	Least Significant	Least Effective

Source: Adapted and Modified from Shitu et al. (2015)

RESULTS AND DISCUSSION

This section gives a presentation of the results from data analysis. The discussion and summary of findings in relation to literature findings was also done in the section.

Results on Factors Affecting Contractors' Cash Flow

This section presents and discusses the RII results of the factors affecting contractors' cash flow of which 24 factors were identified. The RII results are presented in Table 2.

Table 2. RII Ranking on Factors Affecting Contractors' Cash flow

S/No.	Factors Affecting Contractors' Cash flow	RII	Rank	Decision
1	Improper planning and management	0.91	1st	Very Important
2	Poor design	0.82	2nd	Very Important
3	Failure of sub-contractor	0.82	2nd	Very Important
4	Lack of skilled labor	0.8	4th	Important

Table 2. Continued

5	Delays of making payments	0.79	5th	Important
6	Response to all defective work	0.76	6th	Important
7	Change of project payment duration	0.75	7th	Important
8	Project quality	0.75	7th	Important
9	Completion of the disputes	0.75	7th	Important
10	A change of progress payment condition	0.74	10th	Important
11	Misuse of executing the work	0.73	11 th	Important
12	Weather condition	0.73	11 th	Important
13	Number of claims	0.72	13 th	Important
14	Under work measurement	0.7	14 th	Important
15	Change of labour and staff wages	0.7	14 th	Important
16	Delay in releasing retention	0.68	16 th	Important
17	Inability to manage change orders	0.67	17 th	Important
18	Over work measurement	0.65	18 th	Important
19	Payments of material (before/after arrival)	0.63	19 th	Important
20	Lack of adequate insurance	0.62	20 th	Important
21	Material and equipment shortages	0.62	20 th	Important
22	Loan repayment	0.61	22 nd	Important
23	Large retention percent	0.6	23 rd	Fairly Important
24	Bank interest	0.58	24 th	Fairly Important
Average		0.72		Important

Source: Researcher's Data Analysis (2019)

It was revealed in Table 2 that improper planning and management is very important factor affecting the contractors' cash flow (RII = 0.91), other factors affecting contractors' cash flow are important (RII = 0.61 – 0.80) and (RII = 0.58 – 0.60) are fairly important factors. On the average, factor affecting the contractors' cash flow is important (RII = 0.72). Therefore, RII observed ranges from 0.58 – 0.91 with an average of 0.72. This implies that the factors affecting contractors' cash flow is up to an extent of 14.40% on a five-point scale. This finding is in line with the findings of Tarek and Yaqiong, (2014) where results show that the most significant factors are: poor planning, payment duration change of progress payment, financial position of the contractor, and project delays.

Results on Factors Affecting Contractors' Performance

This section examines the factors affecting contractors' performance. This is done by categorizing the factors into 5 related factors which include: contractor related factor; cost related factor; time related factor; quality related factor and external related factor. These was ranked using RII in order of importance. Tables 3 give summaries of the results of the factors affecting contractors' performance.

Table 3. RII Ranking on Factors Affecting Contractors' Performance

S/No.	Factors	RII	Rank	Decision
1	Contractors' Related Factors			
a	Contractor experience	0.95	1st	Very Important
b	Cash flow of project	0.9	2nd	Very Important
c	Leadership style	0.8	3rd	Important
d	Project team leaders commitment to meet cost, time and quality	0.79	4th	Important
e	Size of labor	0.73	5th	Important
f	Budget progress monitoring	0.73	5th	Important

	Site manager's education	0.72	7th	Important
	Project team's (manager) adaptability to change in the project plan	0.7	8th	Important
	Availability of modern equipment	0.7	8th	Important
	Project team leaders	0.69	10th	Important
	Average	0.77		Important
3	Cost Related Factors			
a	Proper planning and scheduling of works	0.93	1st	Very Important
b	Reworks	0.87	2nd	Very Important
c	Escalation of material price	0.84	3rd	Very Important
d	Accurate and reliable budget estimate	0.74	4th	Important
e	Excessive variation orders	0.74	4th	Important
	Average	0.82		Very Important
3	Time Related Factors			
a	Timely decision making	0.9	1st	Very Important
b	Coordination of contractors work in a timely manner	0.86	2nd	Very Important
c	Unavailability of resources	0.86	2nd	Very Important
d	Average delay in regular payment	0.77	4th	Important
e	Site preparation time	0.75	5th	Important
	Average	0.83		Very Important
4	Quality Related Factors			
a	Design team experience	0.97	1st	Very Important
b	Excessive errors or omission	0.84	2nd	Very Important
c	Delay in producing design document	0.83	3rd	Very Important
d	Adequate material test records	0.71	4th	Important
e	Adequate service test records	0.63	5th	Important
	Average	0.79		Very Important
5	External Related Factors			
a	Government policy (political influence from higher authority)	0.91	1st	Very Important
b	Weather conditions	0.81	2nd	Very Important
c	Physical conditions	0.79	3rd	Important
d	Economic influence (economic climate)	0.79	3rd	Important
e	Level of technological advancement	0.67	5th	Important
	Average	0.79		Important

Source: Researcher's Data Analysis (2019)

Table 3 revealed that the contractors' related factors affecting contractor' performance are very important as Contractor experience (RII = 0.95) and Cash flow of project (RII = 0.90) was ranked highest. Other factors ranges between 0.69 and 0.80 were important. On the average, contractors' related factors affecting contractor' performance is important (average RII = 0.77).

Cost related factors affecting contractor' performance are very important in proper planning and scheduling of works; Reworks; Escalation of material price (RII = 0.84, 0.87 and 0.93) respectively. And other factors were important (RII = 0.74). On the average, cost related factor affecting contractors' performance was very important (average RII = 0.82).

time related factors affecting contractor' performance are very important in timely decision making, coordination of contractors work in a timely manner; unavailability of resources; average delay in regular payment (RII = 0.90, 0.86 and 0.86) respectively. And other factors were important (RII = 0.74 and 0.75). On the average, cost related factor affecting contractors' performance was very important (average RII = 0.83).

Quality related factors affecting contractor' performance are very important in design team experience; excessive errors or omission; delay in producing design document (RII = 0.97, 0.84 and 0.83) respectively. And other factors were important (RII = 0.71 and 0.63). On the average, quality related factor affecting contractors' performance was very important (average RII = 0.79).

External related factors affecting contractor' performance are very important in government policy (political influence from higher authority); weather conditions; (RII = 0.91 and 0.81) respectively. And other factors were important (RII = 0.79, 0.79 and 0.63). On the average, external related factor affecting contractors' performance was important (average RII = 0.79).

Results of Effect of Cash flow on Contractors' Performance

This section presents and discusses the results of MIS ranking on the effect of cash flow on contractors' performance in order of significant. The results of the MIS here are summarised in Table 4.

Table 4. MIS Ranking on Effect of Cash flow on Contractors' Performance

S/No.	Effect of Cash flow on Contractors' Performance	MIS	Rank	Decision
1	Timely completion of projects	4.83	1st	Very Significant
2	Total abandonment	4.38	2nd	Significant
3	Damage company reputation	4.15	3rd	Significant
4	Quality Project delivery	4.02	4th	Significant
5	Cost overrun	3.98	5th	Significant
6	Poor quality of end product	3.94	6th	Significant
7	Time overrun	3.90	7th	Significant
8	Disputes	3.79	8th	Significant
9	Regular and prompt order of materials	3.65	9th	Significant
10	Arbitration	3.54	10th	Significant
11	Loss of productivity and efficiency	3.44	11th	Fairly Significant
12	Litigation	3.42	12th	Fairly Significant
13	Reduction in the buying on credit by contractor	3.25	13th	Fairly Significant
14	Regular payment for plant higher and acquisition	3.15	14th	Fairly Significant
15	Increase contractor profitability	3.10	15th	Fairly Significant
	Average	3.77		Significant

Source: Researcher's Data Analysis (2019)

Table 4 revealed fifteen (15) effect of cash flow on contractors' performance. Timely completion of projects was ranked very significant (MIS = 4.83). Nine (9) of these effects are ranked significant. These rang between Total abandonment (MIS = 4.38) and Arbitration (MIS = 3.54). The last five effects were ranked fairly significant. These are Loss of productivity and

efficiency. Timeliness. Reduction in the buying on credit by contractor. Regular payment for plant higher and acquisition and increase contractor profitability with MIS of 3.44, 3.42, 3.25, 3.15 and 3.10 respectively. On the average, the effects of cash flow on contractors' performance are significant with average MIS of 3.77. This implies that the level of significance is 75.4% on a five-point scale. This agrees with the finding of Nnadi *et al.* (2017) which also identified Timely completion of projects as the major effect of cash flow on contractors' performance.

Strategies for Improving Contractors' Performance

The results of the MIS ranking of the strategies for improving contractors' performance is presented and discussed in this section. Table 5 presents a summary of the results of the identified strategies for improving contractors' performance.

Table 5: MIS Ranking on Strategies for Improving Contractors' Performance

S.No.	Strategies for Improving Contractors' Performance	MIS	Rank	Decision
1	Having appropriate planning	4.75	1st	Very Effective
2	Understanding peoples requirements and needs	4.38	2nd	Effective
3	Good leadership	4.25	3rd	Effective
4	Good communication	4.19	4th	Effective
5	Effective contractors and workers relationship	4.10	5th	Effective
6	Timely documentation	4.06	6th	Effective
7	Stakeholder relationship	4.04	7th	Effective
8	Control and administrative system	3.98	8th	Effective
9	Contractors' progress payment on time	3.88	9th	Effective
10	Comprehensive analysis	3.87	10th	Effective
11	Conformance	3.83	11th	Effective
12	Employee empowerment	3.75	12th	Effective
13	Reliability	3.75	12th	Effective
14	Taking accountability	3.73	14th	Effective
15	Minimize change orders during construction to avoid delays	3.73	14th	Effective
16	Hassle free building solution	3.69	16th	Effective
17	Serviceability	3.67	17th	Effective
18	Less paper work	3.65	18th	Effective
19	Plan cash flow by utilizing progress payment	3.54	19th	Effective
20	Existence of key personnel	3.44	20th	Fairly Effective
21	Use of technology when giving information	3.40	21st	Fairly Effective
22	Full cooperation of consultants to contractors or clients	3.37	22nd	Fairly Effective
	Average	3.87		Effective

Source: Researcher's Data Analysis (2019)

From Table 5, twenty-two (22) effective strategies have been identified as strategies for improving contractors' performance. These strategies range from having appropriate planning (MIS = 4.75) which is very effective and Full cooperation of consultants to contractors or clients (MIS = 3.37) which is fairly effective. On the average, the identified strategies for improving contractors' performance have MIS of 3.87 implying that the strategies are effective and are capable of improving contractors' performance by 77.4%. Agrees with the finding of Olanipekun *et al.* (2017) which also identified having appropriate planning as the most effective strategies for improving contractors' performance in building construction project.

CONCLUSIONS

Cash flow is important to any business. It means in the end the survival or the loss of a company depends on the cash flow. This study has brought into focus the effect of cash flow on contractors' performance. After a series of extensive literature review and findings, it was concluded that there are three (3) most important factors affecting contractors' cash flow and the major one is improper planning and management, as such, effective planning and management should always be put in place. It is however finally concluded that the effect of cash flow on contractors' performance in building construction projects in Niger State is significant.

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