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IMPACT OF COST OF CONSTRUCTION PROJECTS IN CAPE COAST METROPOLIS

BY

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Abstract. Cost performance of building construction projects is a key success criterion for clients. Every project requires some estimated amount of cost which forms the basis for cost control and cost performance measurement. The aim of this study was to investigate the factors that affect the final cost of construction projects. The study employed purposive sampling technique in the selection of respondents. Eighty (80) questionnaires were distributed among construction professional (works engineers, quantity surveyors, project managers, architects, site supervisors and contract managers) on government projects within Cape Coast Metropolis. Out of the eighty (80) questionnaires administered, seventy-five (75) were returned, representing 93.8% response rate.

Majority of the firms were D_1K_1 and D_2K_2 contractors respectively. Findings from the study show that unexpected ground conditions, design changes, pricing or billing errors, inflation or relative price changes and purchasing product without warranty were identified to be the major factors that impact the final cost of projects. Whereas changes in the costs of projects, delays in completion, extension of project time, project abandonment and increase in

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the scope of work during design changes, were identified as the key effects of the factors influencing the final costs of projects. Therefore, extensive visibility studies, site visit, ground investigations and explorations should be carried out before the commencement of any project. Clients should articulate their briefs well to aid designers to develop designs that suit their required needs. Effective market survey and design planning should be judiciously undertaken. Quantity surveyors and cost technicians should undertake rigorous measurement of all work items; clients should be certain of the extent of their financial commitment before they embark on any project.

Keywords: cost performance; construction projects; design changes; estimated cost; quality; time; variations.

1. Introduction

Construction projects have a lot of activities associated with it and each activity comes with cost. The construction industry in every country constitutes a large part of the economy and directly contributes to the growth of the national economy (Ofori, 2012). The Institute of Statistical Social and Economic Research (ISSER, 2008) reported that between 2006 and 2007, the construction industry contributed 0.7% and 1.0% respectively to Gross domestic product (GDP) of Ghana. Cost is a very important consideration and parameter in project life cycle analysis. Despite its established significance, it is not easy to see a construction project failing to achieve its objectives within the specified cost (Azhar, Rizwan & Syed, 2012). Sarfo (2007) stated that the cost of housing has soared out of control to the point that only few wealthy Ghanaians can afford to buy a house in the urban core. Most construction projects experience cost overrun and therefore exceed initial contract estimate. In simple terms, it becomes difficult to complete projects within allocated cost. When design changes occur during the construction stage, the probability of cost rising becomes high. Much to the displeasure of clients, contractors and consultants, projects experience extensive delays thereby exceeding their initial estimated duration and cost estimates (Aftab, Ismail, Mohd & Ade, 2014). The delivery of projects within estimated cost can be achieved, but that requires a good starting estimate, an awareness of factors that can cause cost increase and project management discipline (Shane, Keith, Stuart & Cliff, 2009).

In order to develop a strategy or plan for successful construction projects, the most cost influential factors should be determined and considered in making any decision. This research discusses the factors affecting the final cost of construction projects within the Cape Coast Metropolis; it investigates the reason why projects exceed their estimated budget and the effects of the factors.

2. Literature Review

The construction industry renders services which are needed for the production of durable buildings and works. Construction projects refer to structures which are erected in accordance with the idea or design of the structures already stated either in drawings and directives or in mathematical instructions to satisfy its purpose functionally, structurally and aesthetically (Ugulu & Ikwuogu, 2010). In construction, cost, time and quality have been taken as the basis for the measurement of the success of project. The cost performance of building construction projects is a key success for project funders. The accuracy of cost estimating has a significant effect on the construction industry. For instance, it may have a serious effect on contractor ability to compete successfully with other contractors and have an impact on contractor's profit. Such factors should be taken into consideration when preparing cost estimating for any future project. The estimating process should be given a careful consideration and should not be rushed through if an accurate estimate is the goal. Estimates are prepared and updated continually as the project progresses throughout the execution phase. Mohammed (2011) further stated that cost estimating is one of the most important parameters that contributes to construction project success. Estimates improve contracting and form the basis for analysing costs of projects. It is the responsibility of the estimator to provide dependable estimates that will give the client a clear financial picture of his commitment.

2.1 Factors that Impact on the Final Cost of Construction Projects

The cost of a project is an important issue to all project parties; it is a primary worry for majority of construction clients. Clients will always want to know their financial commitment before they initiate any project. This leads them to the quantity surveyor whose primary activity is to predict the likely cost of building works and manages them to ensure that the client's approved budget is not exceeded (Cunningham, 2013). In most circumstances, the final costs of project exceed the initial cost prepared during the planning stage or at the start of the whole construction process (Shane *et al.*, 2009). Ibrahim and Nabil (2013) indicated that by the time a project is completed, the actual cost exceeds the original contract price by about 30%. Over the period spanning between the beginning of the project and the completion, various factors may impact the final project cost (Shane *et al.*, 2009). Aje *et al.* (2009) posited that contractors' management capability have significant impact on cost and time during project execution. Whiles delays from clients or government on monthly payments to

contractors often result in cost overruns (Chileshe & Berko, 2010). Azhar *et al.*, (2012) was of the view that, it is rare for projects to be completed within expected budget. There are several factors that accounts for the differential between estimated cost and final cost of projects. Various researches have been conducted in this sensitive area to identify the various factors that influence the cost of construction. Aftab *et al.* (2014) conducted a study into the factors affecting construction cost performance and he identified several factors. The most important factors he identified included cash flow and financial difficulties faced by contractors, shortage of site workers, lack of communication among parties, incorrect planning and scheduling by contractors, contractor's poor site management and supervision delay in material purchasing, unforeseen ground conditions, inadequate contractor experience and frequent design changes. Gomez (2012) conducted a case study on three projects for cost performance in the United Kingdom (UK). After comparing the findings in the three projects, he concluded that; lack of proper training and experience of project managers, conflict between project parties, design changes, contract and specification interpretation, and lack of appropriate planning were the factors that influence the cost of construction. Aziz, (2012) discovered that factors such as, wrong method of cost estimation; inaccurate cost estimation; unexpected ground conditions; inflation of prices and fluctuation in prices of raw materials were responsible for cost variation. In another study, Hiral, Chirag, Rushabh and Urvesh (2013) revealed that the major factors which influenced cost included; increase in the prices of materials and lack of funds. Eshofonie (2008) also indicated similar cost factors and more, namely; cost of materials, incorrect planning, wrong method of estimation, fluctuation of prices of materials, absence of construction cost data and high cost of transportation.

2.2 Effects of Changes in Design of Construction Projects

The words “Change Order” as indicated by Osman, Omran and Foo (2009) connote strong feelings of negativity for all involved in construction projects. Owners do not like them because they generally feel they are paying for others mistakes. In some cases, contractors believe that change orders disrupt workflow and require additional paperwork and time. In other cases, contractors see change orders as a means of improving their income on a project. However, it is generally accepted that consultants, contractors and owners agree that projects would be better without change orders. Osman *et al.* (2009) defined the term change order as any deviation of the project from an agreed scope and schedule. Change orders contribute cost increase and schedule delays. Changes on one project can also affect other unrelated projects by tying up resources that are committed elsewhere. Negative relationships between the

parties are another by-product of changes on a project. Not only is workflow disrupted, but also trying to get quick responses, shop drawings, and many other things required to get back on schedule create relationships problems among parties (Rashid, Elmikawi & Saleh, 2012). Homaïd, Eldosouky and AlGhmdî (2011) in their research on cost of construction projects concluded that change in project scope originating from change in owner requirements, is an avenue for project cost increase and a recipe for cost overruns.

A research conducted by Jawad (2009) on causes, effect and controls of variation orders in large building construction concluded that the owner is the major source of variation. However, Olsen (2012) researched on the most common causes of change orders to uncover which divisions of work were most affected to the greatest number of changes orders. It was found that design errors were responsible the majority of changes. The main sources of change orders in Kuwaiti building construction as investigated by Bassioni and Hamza (2005) showed that owners were responsible for 47% of change orders and contractor 12%. The study showed that the sources were design changes - owner 38%, problems on site - contractor 12% and changes by regulatory agencies 12%. Wambek (2011) examined the similarities and differences between craft workers, foremen, and project managers in terms of starting time and task duration variation. Variation in public construction projects in Oman was discovered by Alnuaimi (2010). Whiles Oladapo (2007) also identified significance of variation as a cause of cost and time overruns. The discovery showed that changes in specification and scope initiated mostly by project owners and their consultants were the most sources of variation. However, Arain and Pheng (2005) provided an in-depth analysis of the potential effect of variations in building projects.

3. Methodology

Questionnaire survey was selected for data collection (Abdal-Hadi, 2010) and as it was designed to capture the current construction industry experiences among clients, consultants and contractors (Doloi, 2012). The process of data collection involved distribution of structured questionnaires among construction professionals (works engineers, quantity surveyors, project managers, architects, site supervisors and contract managers) on government projects within Cape Coast Metropolis (Saunders *et al.*, 2007). The firms executing the various contracts fall under the following categories: Building and Civil Engineering Works Contractors (D_1K_1 , D_2K_2 , D_3K_3 and D_4K_4) based on their financial classes, ranging from the highest to the lowest (**US\$500,000.00, US\$ 500,000.00, US\$ 200,000.00 and US\$ 75,000.00**) (Civil Engineering, 2016). Roads, airports and related structural contractors are classified as 'A' and

concrete bridges, culverts and other structural contractors are classified as ‘B’ based on their financial standings. The main criteria for classification were related to company's previous experience, capital, value of executed projects and financial standing (Enshassi *et al.*, 2007). They may possess similar characteristics in terms of how they are managed, but their financial classification is what put each of them in their definitive categories. A total of Eighty (80) construction professionals (works engineers, quantity surveyors, project managers, architects, site supervisors and contract managers) on selected government projects within Cape Coast Metropolis were purposively selected for the study (Saunders *et al.*, 2007). Eighty (80) questionnaires were distributed to respondents and seventy-five (75) were retrieved representing 93.8% response rate. A five (5) point ranking system, using a Relative Importance Index (RII) was used for the analysis of the factors affecting the final cost of construction projects. The relative importance was used to determine professionals’ perception of the relative importance of the factors (Abdal-Hadi, 2010). The RII has five-point scale, ranging from 1 (not important) to 5 (very important). Tables and charts were also employed in the analysis of the data.

4. Results and Discussions

The years of operation of the respondents in the context of this research was determined by the number of years of professional practice and active involvement in construction work. The idea here is that employees’ years of operation is likely to have a direct influence on his knowledge on the factors affecting the final cost of construction projects. It was ascertained that most of the respondents have been in their company’s operations for over 21 years, whereas 18% of the respondents have served between 16 to 20 years. 14 % being the least percentage of the respondents, have served for less than 5 years.

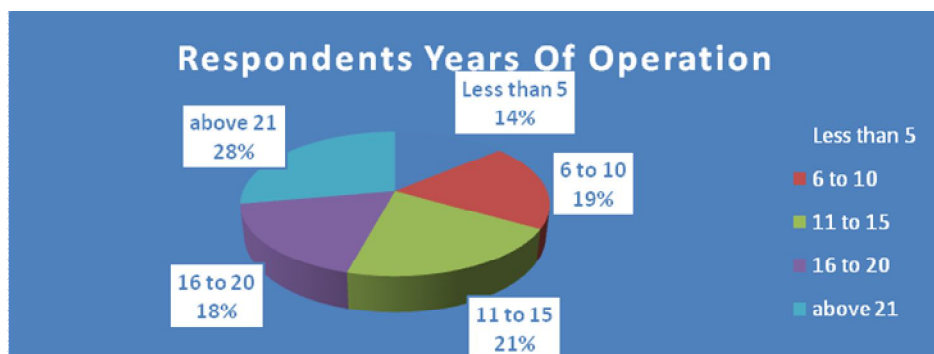


Fig. 1 – Respondents years of operation.

Fig. 2 below indicates 38% of the respondents were working with D₁K₁ contractors and followed by D₂K₂. The least respondents were contractors with A₂B₂ classification. The contractors may possess similar characteristics in terms of how they are managed, but their financial classifications are what differentiate one from the other.

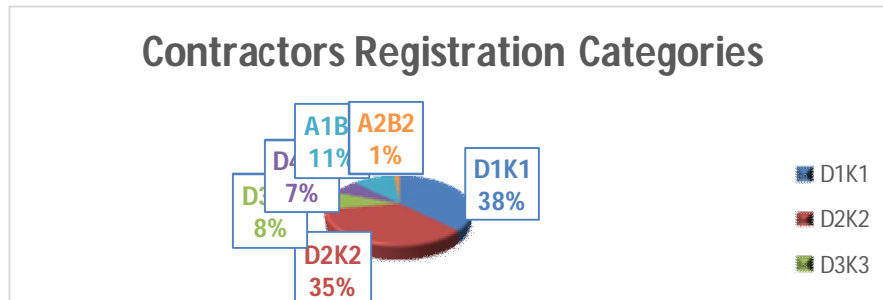


Fig. 2 – Contractors registration categories.

On the representation of the respondents as shown in Fig. 3 from whom opinion on the subject matter was solicited. Majority of the respondents were contractors and managers respectively. The least of the respondents were quantity surveyors. The highest respondents were the core practitioners in the construction industry and have knowledge on most issues on site.

Fig. 4 shows most of the respondents have worked in their various firms for over 16 years and followed by respondents who have worked for less than 5 years.

Fig. 6 indicates 46% of the contractors often have budget overrun, whereas 12% contractors indicated it never occurs. This indicates that most of the projects executed by contractors exceeded their initial budget.

Table 1 indicates that unexpected ground conditions was ranked first by the respondents as the most important factor that affects the final cost of a construction project with RII value of 0.808. Where the ground conditions or the physical state of existing structure was found to be different from the expected budget. This can obviously have a significant effect on the project which may result in change in working method (*e.g.* the line and level of a trench may remain the same, but different equipment and a different working method may be required); a complete revision of the design (*e.g.* the design of the foundations may need to be altered due to the unexpected nature of the soil at a certain depth) or in extreme cases, the works may be abandoned altogether. In the light of the expectations, the bill of quantities of construction projects are deemed as provisional. Changes in surface ground conditions can result in several problems including difficulty in actually moving machinery and

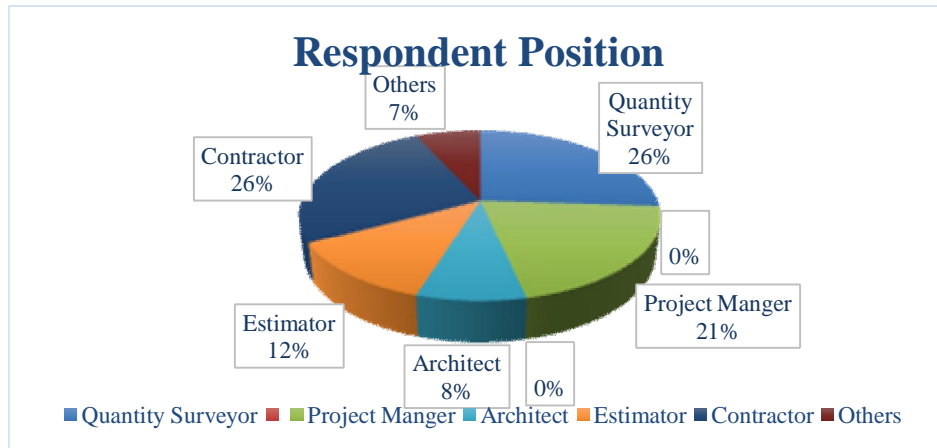


Fig. 3 – Respondents positions.

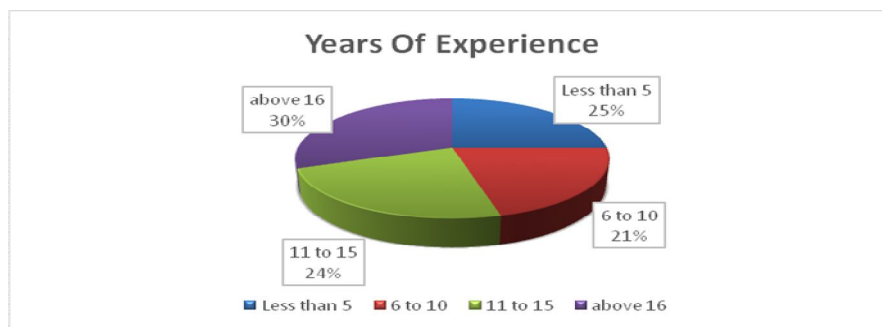


Fig. 4 – Years of experience.

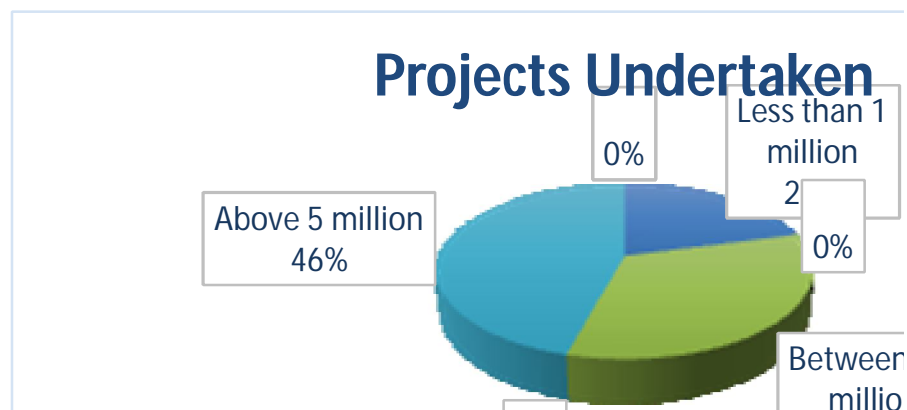


Fig. 5 – Projects undertaken.

Project Cost Exceeding The Initial Budget

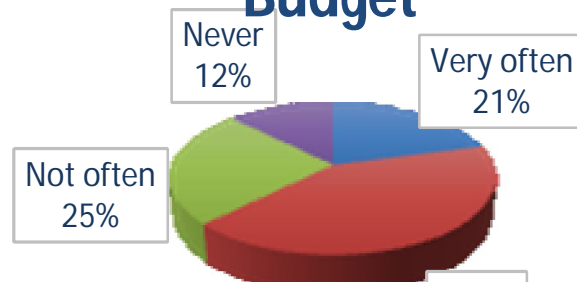


Fig. 6 – Project cost exceeding the initial budget.

supplies around the site, and in undertaking excavations and laying foundations. This can also increase costs and add to the construction time required. Design changes was considered the second most important factor that affects the final cost of a construction project with RII value of 0.805. Design changes can take several forms, such as additions, omissions, substitutions and in some instances a combined of the listed few (Akomah *et al.*, 2018). It may be that the project sponsor wants additional elements to be included in the project or changes to existing ones. This factor was among the several factors Aftab *et al.* (2014) considered as dominant in affecting the final cost of a project.

Pricing or billing errors was also ranked second by respondents as the most important factor that affects the final cost of a project with RII value of 0.805. Stakeholders are mostly responsible for the generation of errors in construction documents. These errors come from professionals' inexperience, non-availability of information, lack of quality management, negligence, insufficient planning, wrong procurement method and lack of understanding of conditions of contract. Poor billing or pricing errors will affect the project sum by increasing or decreasing at the final stage of the project. Inability to provide documents, poor communication between professionals and clients, incomplete and incorrect drawings, missing input information, changes to specification and poor cost control methods. Inflation/relative price changes came fourth with RII value of 0.792. Inflation can increase the original estimates of construction costs. It is possible that this factor may have been included in the determination of the cost of the project, but if the rate of inflation increases beyond the anticipated level during the construction period, then the original cost estimate will be exceeded. Obviously, any other factor that delays a project will expose the project to the risk of further inflationary cost increases. The fifth ranked

factor in Table 1 is purchasing product without warranty with RII of 0.768. Products bought without warranties when they go bad in the course of the project without any fault of the purchasing firm cannot be redeemed and becomes additional financial burden to the purchaser.

Table 1
Factors Affecting Final Cost of Construction Projects

Factors affecting the final cost of construction projects	Scale					W	A*N	RII=W/A*N	R
	1	2	3	4	5				
Unexpected ground conditions	3	8	6	24	34	303	375	0.808	1 st
Design changes	3	6	9	25	32	302	375	0.805	2 nd
Pricing or billing errors	3	6	9	25	32	302	375	0.805	2 nd
Inflation/relative price changes	3	7	8	29	28	297	375	0.792	4 th
Purchasing product without warranty	4	6	14	25	26	288	375	0.768	5 th
Poor project management	5	6	11	29	24	286	375	0.763	6 th
Fluctuation in prices of raw materials	4	8	10	29	24	286	375	0.763	6 th
Poor material and component quality resulting in breakages	4	8	12	26	25	285	375	0.760	8 th
Exchange rate	3	7	14	30	21	284	375	0.757	9 th
Incorrect planning	4	6	15	27	23	284	375	0.757	9 th
Inappropriate contractors	3	8	13	30	21	283	375	0.755	11 th
Specifications	2	8	17	26	22	283	375	0.755	11 th
Lack of flexibility and adaptability	5	17	15	23	25	281	375	0.749	13 th
Funding problems	5	8	12	27	23	280	375	0.747	14 th
Poor workmanship/quality leading to reworks	4	10	13	23	25	280	375	0.747	14 th
Failure to analyze the cost of a problem	5	8	10	31	21	280	375	0.747	14 th
Shortages of material, components and plant	4	5	15	37	14	277	375	0.739	18 th

Table 1
(Continuation)

Factors affecting the final cost of construction projects	Scale					W	A*N	RII=W/A*N	R
	1	2	3	4	5				
Increase in Expenses	5	7	16	25	22	277	375	0.739	18 th
Unnecessary client interference which results in delay	4	5	21	26	19	276	375	0.736	20 th
Inefficiencies in contractor's operations	4	10	11	31	19	276	375	0.736	20 th
Excessive overtime	5	13	8	25	24	275	375	0.733	22 nd
Unexpected weather conditions	5	10	12	28	20	273	375	0.728	23 rd
Conflict between project parties	4	10	18	21	22	272	375	0.725	24 th
High cost of transportation	2	14	13	28	18	271	375	0.723	25 th
Land acquisition costs	6	10	14	24	21	269	375	0.717	26 th
Previous experience of contractor	5	11	15	25	19	267	375	0.712	27 th

Weighting (W); Relative Importance Index (RII); Highest weight (A); Total number of respondents (N); Ranking (R).

Table 2 indicates that changes in the cost of project was ranked first with RII of 0.832. Respondents were of the view that this effect was the most critical among all the factors affecting the final cost of construction projects. Changes in the cost of project may occur as a result of changes in specification, design changes, unexpected ground conditions, etc. A higher specification can affect the cost of operations, cost of workmanship and cost of products purchased. While delay in the completion of work was ranked the second key effect of the factors affecting the final cost of construction projects with RII value of 0.819. Delay is one of the biggest problems often experienced on construction project sites and it is due to prolonged construction periods and disruptions. Delays and disruptions are among the challenges faced in the course of executing construction projects and they are sources of potential risks. There are also risks and factors as indicated by these researchers (Zou *et al.*, 2006; Aiyetan *et al.*, 2008) that affect construction project delivery time, which also cause delay. Delays can instigate negative effects, such as, increased costs and loss of productivity. Project delay may give rise to extension of time which

can trigger cost overrun. Extension of project duration was ranked third with an index of 0.816. Projects frequently finish late and over budget, thus causing organisations heavy penalties and damages. Construction projects often run into delays and standard form construction contracts usually make provision for the contractor to claim an extension of time in certain circumstances. Project duration are extended when there are design changes and where delays in design approval result in delay to the project. Where the ground conditions or the physical state of existing structures is found to be different from expected, this can obviously have a significant effect on the project duration.

Table 2
Effects of the Factors Affecting the Final Cost of Construction Projects

Effects of the factors affecting the final cost of construction projects.	Scale					W	RII=W/A*N	A*N	R
	1	2	3	4	5				
Change of cost of the Project	2	7	5	24	37	312	0.832	375	1 st
Delay in the completion of work	3	5	3	35	29	307	0.819	375	2 nd
Projects duration are extended	2	4	7	35	27	306	0.816	375	3 rd
Abandoning of the Project	3	5	7	29	31	305	0.813	375	4 th
Addition of work during design changes may increase the overall cost of the project	1	4	14	31	25	300	0.800	375	5 th
Delay in the commencement of work on site	5	4	8	28	30	299	0.797	375	6 th
Wastage of Materials	3	5	8	34	25	298	0.795	375	7 th
It influences the financial power of the client	2	11	17	27	23	298	0.795	375	7 th
Poor workmanship	2	5	13	31	24	295	0.787	375	9 th
Client financial commitment cannot be met	2	3	19	26	25	294	0.784	375	10 th
Disruption of activities on site	1	4	17	31	22	294	0.784	375	10 th

Table 2
(Continuation)

Effects of the factors affecting the final cost of construction projects.	Scale					W	RII=W/A*N	A*N	R
	1	2	3	4	5				
Quality of work may be affected	3	5	10	35	22	293	0.781	375	12 th
Contractors expenses are affected	2	6	15	27	25	292	0.779	375	13 th
Decrease in productivity of workers	3	5	12	36	19	288	0.768	375	14 th
Casual workers income will be affected because of non- activity as result of bad weather condition on site	2	8	11	33	21	288	0.768	375	14 th
Quantity of material to bought at a time may be affected	1	8	10	39	17	288	0.768	375	14 th
Increase the duration of individual activities	5	7	12	24	27	286	0.763	375	17 th
Interruption in the continuity of site activities	2	8	13	31	21	286	0.763	375	17 th
Contractors profit will be affected	3	6	17	27	22	284	0.757	375	19 th
Demolition and re work	4	7	11	33	20	283	0.755	375	20 th
Coordination, productivity and progress on site may be affected	3	6	15	33	18	282	0.752	375	21 st
Increase in the unit cost of ground activities	4	6	16	28	21	281	0.749	375	22 nd
It influences client requirement	4	6	15	30	20	281	0.749	375	22 nd
Nomination of contractors for other projects	2	11	13	27	22	281	0.749	375	22 nd
Client may be pushed to go for substitute materials or products	3	6	16	33	17	280	0.747	375	25 th
Conflicts between the Parties	4	8	14	29	20	278	0.741	375	26 th

Weighting (W); Relative Importance Index (RII); Highest weight (A); Total number of respondents (N); Ranking (R).

Abandoning of the project was ranked fourth as a key effect of the factors affecting the final cost of construction project with RII value of 0.813. This can be described as a project that has started at an earlier date, but for one reason or the other the contractor or client abandons the project. Some reasons advanced for failed construction projects are: incorrect estimation; lack of available skilled personnel; inadequate planning; poor risk management; misunderstanding of the work requirement; poor quality control by regulatory agencies; corruption and communication gap among the personnel. Other factors are cost; the developer and the contractors; inability of clients to engage contractors or designer's with requisite capabilities to do the work; failure on the part of contractors to obtain vital inputs such as materials, manpower and machines. When this happen, it reduces the beauty of that environment and causes threat to people living there. Additional works during design changes may increase the overall cost of the project. This was ranked fifth as the key effect with RII value of 0.800. Design changes can be surprisingly complex because it is more expensive and increases the final cost of a project. Design changes are often examined to identify their dangers and complexity, mostly in the area of engineering design changes. Many companies face the following situation: customers request a new version of a design incorporating useful changes. Initially, it might seem like a small change which can be implemented quickly. Even with a rich experience, designers may not have predicted how changes would propagate across the design from one part to another.

5. Summary of Findings

The study revealed that unexpected ground conditions, design changes, pricing or billing errors, inflation/relative price changes and purchasing product without warranty are the most critical factors that affect the final cost of construction projects. On the other hand, high cost of transportation, land acquisition costs and previous experience of contractors were considered as the least factors that affect the final cost of construction projects. Changes in the cost of project, extension of projects duration, project abandonment and additional works during design changes were the key effects of the factors affecting the cost of final projects. Influence on clients' requirements and nomination of contractors for other projects may force contractors to go for substitute materials or products, and conflicts between the parties were the least effects of the factors affecting the final cost of construction projects.

6. Conclusions and Recommendations

The study investigated the factors that affect the final cost of construction project. It was found out that unexpected ground conditions, design

changes, pricing or billing errors, inflation/relative price changes and purchasing product without warranty were the major factors that affected the final cost, whereas nomination of contractors for other projects, client pushing to go for substitute materials or products, and conflicts between the parties least affected the final cost of construction project. Changes in the cost of project, delay in the completion of work, extension of project duration and abandonment of project were considered as the major effects of the factors affecting the final cost of construction projects.

It is recommended that client should articulate their design briefs very well to assist the design process. Quantity surveyors and cost technicians should undertake rigorous measurement of all work items. Clients and consultants should minimise changes in specification and scope of work, as increase scopes come with extra financial burden. Effective management capabilities should be instituted by construction companies; government should ensure that contractors monthly payments are prompt.

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IMPACTUL COSTULUI PROIECTELOR DE CONSTRUCȚII ÎN METROPOLA CAPE COAST

(Rezumat)

Performanța din punctul de vedere al costului proiectelor de construcții reprezintă un criteriu cheie privind rata de success a acestora. Proiectele au nevoie de un buget cee ace garantează implicarea financiară a beneficiarului și servește, totodată, ca bază de control și evaluarea a costurilor finale ale unui proiect în zona metropolitan Cape Coast. Scopul studiului de față este acela de a identifica factorii ce pot afecta costul final al unui proiect de construcții. Chestionarele au fost distribuite subiecților selectați pe baza relevanței asociate cu scopul lucrării. Astfel, s-au distribuit 80 de chestionare specialiștilor în domeniu (șefi de punct de lucru, manageri de proiect, arhitecți, diriginți de șantier, etc.) cu experiență în proiecte de construcții cu finanțare de la bugetul de stat derulate în zona metropolitan Cape Coast. Din cele 80 de chestionare transmise, s-au primit 75 de răspunsuri reprezentând o rată de răspuns de 93.8%.

Majoritatea răspunsurilor au fost din partea unor companii de tip D_1K_1 și D_2K_2 . Din evaluarea răspunsurilor primite s-a constatat faptul că situații precum: condiții de

teren dificile/neprevăzute, modificări ale proiectului initial, cantități sau prețuri incorecte, inflația sau achiziția de produse și servicii fără garanție reprezintă cauze majore care contribuie la modificarea costului initial al unui proiect. Toate acestea pot duce la modificări ale costului, întârzieri în execuție, oprirea parțială sau totală a proiectului. De aceea, se impune ca înainte de demararea unui proiect să se efectueze vizite la amplasament și, pe cât posibil, să se obțină un profil geologic al amplasamentului. Beneficiarii ar trebui să ajute proiectanții pentru ca produsul final/proiectul să fie cât mai aproape de ceea ce se dorește. Studiul de piață și planificarea lucrărilor ar trebui, la rândul lor, să fie făcute minuțios. De asemenea, evaluarea cantităților și a manoperei ar trebui făcută cât mai aproape de valoarea reală astfel încât beneficiarul să fie informat înainte de faza de constructare privind costul total al proiectului.