Assessing Causes and Effects of Variation order in Construction Project in Ekiti State, Nigeria.

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ABSTRACT

Causes and effect of variation order in construction environment of developing economy of Ekiti State is investigated with the prospect to highlight possible limitations and managing properly issues associated with variation order for the development of the state. Structured questionnaire was administered to randomly selected construction and consulting firm, involves with construction project in the state simple statistical tool of frequency, average and ranking were deployed to analyse generated data from respondents. The outcome is similar to results from other research work.

Keyword: *Variation, Changes, Modification, Variation /Change Order, Variation Clause, Contractual Terms, Omissions.*

1. INTRODUCTION

The Nigerian construction industry occupies an important position in the nation's economy, although the industry is facing many problems in its projects implementation. One of the major problems faced by the construction Industry is the issue of the variation order occurring during the construction phase (Ibbs *et al*., 2001), which results in delayed projects, causing other negative effects [5]. It is almost becoming a rare occurrence for a project not to have variation, thus becoming a normal occurrence in all construction projects. Most contracts make provisions for possible variations given the nature of building construction project (Finsen, 1999; Wainwright and Wood, 1983) [2], [10]. An aspect of the variation clause is that it tends to encourage clients to change their minds and embark on building projects without having properly thought through their project requirements (Finsen, 1999) [2].

Uff (2005) further pointed out that a clause permitting variation of works is an essential feature of any construction contract because without it the contractor is not bound to execute additional work or to make omissions or changes [4]. It is the same for the architects; they tend not to crystallize their intentions on paper before the contract is signed because they know the variation clause will permit them to finalize their intentions during the term of the contract (Wainwright and Wood, 1983) [5].

Ashworth (2001) added that the advantage of the variation clause is that it allows the architect or other designers to delay making some decisions almost until the last possible moment [1].

Contractual clauses relating to changes allow parties involved in the contract to freely initiate variation orders within the ambit of the scope of the works without alteration of the original contract. Variation orders involve additions, omissions, alterations and substitutions in terms of quality, quantity and schedule of works. Without contractual clauses, the building contractor would have to agree to erect the building shown on the drawings and represented in the bills for a contract sum. Any minor change that the client or his/her architect wishes to make later would mean that the contract has to be cancelled and a new one drawn up (Wainwright & Wood, 1983) [10]. Once a contract has been concluded, its terms cannot be changed unless the contract itself contains provisions for variation and then the only permitted variations are those that fall clearly within the contractual terms (Willis & Willis, 1980) [11]. Uff (2005) indicated that a clause permitting variation of works is an essential feature of any construction contract because without it the contractor is not bound to execute additional work or to make omissions or changes [9]. Under contractual provisions, the client has the right to vary the extent and the nature of the performance to be rendered by the contractor (Wainwright & Wood, 1983) [10]. Furthermore, the contractor cannot refuse to carry out the varied obligation with the only remedy being an adjustment of price to be paid for the performance, and in appropriate circumstances, an extension of time in which is meant to execute such performance (Finsen, 2005) [3]. Ssegawa *et al* (2002) argued that the spirit in

which variation orders are permitted allows the contract to proceed without compiling another contract to cater for the changes [8].

Variation order contains a set of instruction which allows changes or modifications to be made to an earlier agreement in terms of volume or nature of task to be carried out. (O'Brien 1988) [6]. These changes however occur after the award of the initial contract or after work might have commenced at the construction sites. The changes may be due to various reasons such as the modification of scope, schedule, costs and methods. Change orders are the reasons why most contractors don't meet up with the time specified for completion of most contract works (Pourrostam and Ismail, 2011) [7]. Also, issues relating to funding, design, aesthetic, geological nature in terms of weather conditions to prospects of construction, statutory changes, product rectification and imbalances between contract documents are some other factors that initiate these variation orders (Hanna *et al.* 2002) [4]. This study seeks to investigate the cause and effect of variation in construction environment of developing economy of Ekiti State, with the prospect to highlight possible limitations and managing properly issues associated with variation order for the development of the state.

2. METHODOLOGY

This Study involves a simple research design of study population and sampling. Questionnaires was administered various organizations both construction and consultancy firms. The data would be analysed using statistical system of data processing. Structured questionnaire was administered to building and construction firms. The questionnaire was designed to collect different opinion of the relative construction firms.
The research work targeted ten contracting firms in Ekiti State Namely: KBV Global Resource, Q Serve Engineering Limited, Atolly Strategies International Company Limited, God's Will Venture, Prowess Engineering Limited, Kar-Bor Venture, Arije Nigeria Limited, Cost Concept Nigeria Limited, Cima Resources Nigeria Limited and Clem B Tech Nigeria Limited, all in Ekiti State. The primary data generated with this questionnaire was analysed with simple statistical tools frequency, average and ranking to draw conclusions on cost and effect on variation order on construction project in Ekiti State, Nigeria.

2.1. SECTION A. General information of respondents

Table 1: Data on Construction Project Operators

NATURE OF FIRM		Frequency	Percentage (%)
	Private	24	80
	Public	6	20
	Total	**30**	**100**
TYPE OF FIRM	Contractor	10	33.3
	Client	4	13.3
	Quantity Surveyor	6	20
	Architect	3	10
	Engineers	5	16.7
	Builders	2	6.7
	Total	**30**	**100**
DESCRIPTION OF RESPONDENTS	Quantity Surveyor	10	33.3
	Builder	8	26.7
	Architect	7	23.3
	Engineer	5	16.7
	Total	**30**	**100**
YEARS OF EXPERIENCE	1-5	6	20
	6-10	20	66.7
	11-15	3	10
	16-20	1	3.3
	Total	**30**	**100**
THE TOTAL NUMBER OF PROJECT HANDLED BY THE ORGANIZATIONS	1-5	1	3.3
	6-10	7	23.3
	11-15	9	30
	16-20	13	43.3
	Total	**30**	**100**

2.1.1. ANALYSIS OF DATA AND DISCUSSION

Table 1**:** showing that (80%) of the total respondents are private organizations indicates active participation of private organisation in construction project in Ekiti State. Contractors and related professionals are also actively involved in the construction project with presence of Quantity Surveyors, Architects, Engineers and Builders. Respondent with more than 6 years of experience indicates maximum percentage frequency of more than 77% in construction project environment in Ekiti State. This years of experience is quite reliable for professional opinion on construction project activities. All respondents have been active on one project or the other in Ekiti State.

Table 2: Causes and effect

CAUSES OF VARIATION ON CONSTRUCTION PROJECTS IN EKITI	S/N	CAUSES OF VARIATION	Mean	Ranking
	A	Modification of design	4.44	1st
	B	Modification of Quality	4.39	2nd
	C	Modification of quantity	4.35	3rd
	D	Omission of work	4.26	4th
	E	Addition of work	4.20	5th
	F	Substitution of Work	4.20	6th
	G	Postponement of work	4.11	7th
	H	Correction of errors in bills	4.09	8th
	I	Correction of errors in drawings	3.98	9th
OCCURRENCE OF SITE INSTRUCTIONS	S/N	SITE INSTRUCTIONS	Mean	Ranking
	A	To resolve discrepancies (e.g. rectify errors)	4.26	1st
	B	To vary the design, quality or quantity of the works	4.11	2nd
	C	To reiterate or enforce contractual provisions	4.35	3rd
	D	To deal with monetary allowance	4.26	4th
	E	To protect the client's interest	4.20	5th
EFFECT OF VARIATION ON CONSTRUCTION PROJECTS IN EKITI	S/N	IMPACT OF VARIATION	Mean	Ranking
	A	Increase in final contract sum	4.45	1st
	B	Extension of time	4.42	2nd
	C	Cost overrun	4.40	3rd
	D	Liquidated and ascertain damages	4.38	4th
	E	Breach of contract	4.26	5th
	F	Claims	4.11	6th
	G	Compensation	3.85	7th
	H	Decrease in final contract sum	2.84	8th
	I	Others specified	1.13	9th

Analysis of the causes and effects of the respondent's data were presented in table 2.
The result below shows the analysis of findings on the causes and effect of variation in construction projects in Nigeria. The analysis was derived with the use of statistical tools.
The result shows that modification of design is the most prominent and the most significant causes of variation on construction projects. Ranked after modification of design are modification of quality, modification of quantity, omission of work, addition of work, substitution of work, postponement of work, correction of errors in bills and while the least in the ranking order is correction of errors in drawing. The frequency of occurrence of site instruction in construction projects in Ekiti State, indicates that discrepancies (e.g. rectify errors, omissions) mostly occur on construction projects. In respective order of ranking instruction to vary the design, quality or quantity of the works, instruction to reiterate or enforce contractual provisions, instruction to deal with monetary allowance, and finally instruction to protect the client's interest all affects the construction project. From the analysis of the respondent data in the table, it is obvious that variation leads to increase in

extension of time and consequently lead to final contract sum, Cost overrun, Liquidated and ascertain damages, Breach of contract, Claims, Compensation, Decrease in final contract sum and other factors.

3. CONCLUSION

The project has revealed concept of variation causes, effect, frequency of occurrence on construction projects and its effects on construction projects in Ekiti State, Nigeria. The findings ascertained that;

1. A large percentage of construction projects are subjected to variation during the period of construction leading to the increase in the final contract sum of construction project.
2. Respondent concluded that variation orders are frequent and lead to Time overrun which lead to increase in the time of the contract.
3. Modification of design, modification in quality and modification of quantity were ranked high as the main causes of variation and fluctuation on construction projects in Ekiti State, Nigeria.
4. Time spent on predesigned planning and careful attention to details related to environmental conditions, capacity and the needs of the client and the contractor's capacity are sacrosanct in reducing the frequency of the variation order
5. Effective documented communication would always play an important role in resolving any form of variation order that may arise in any construction project to the satisfaction of all parties.

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