



## Heuristics Behaviour and Quantity Surveyors' Estimates: What We Need to Know

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**Abstract-** Heuristics is a short cut method of solving complex situations, among which its application on preparation of preliminary cost estimates by the Quantity Surveyors (QS) is no exception. This study therefore, aimed at examining heuristics behaviour with view to improving accuracy of preliminary cost estimates in a fluctuating economy. The study used purposive sampling technique to select quantity surveyors from Ibadan Metropolis. 80 numbers of self-administered questionnaires were distributed to the selected quantity surveyors in order to collect relevant data and a total of 50 (62.5%) were returned and analysed. Data were analysed using both descriptive and inferential statistics. The results showed that quantity surveyors make use of heuristics behaviour when preparing preliminary cost estimates and the most commonly use heuristic type by the quantity surveyors was 'availability heuristics. Assessing similarities of elements of buildings/objects, use of examples that comes to mind at first among others were most influential characteristics of quantity surveyors' heuristics behaviour while level of experience, lack of consultation with experienced QS were established to be responsible for use of heuristics. One of the impacts of use of heuristics behaviour on QS' estimates was reduction in time of contract administration. The study recommended that a matured and experienced QS should be involved in preparation of preliminary cost estimates. Also, current data on cost and updating of data should be given priority by the two regulatory bodies of quantity surveying profession.

**Keywords:** construction project, client's budget, heuristics, preliminary estimates, quantity surveyors, availability heuristics.

### 1.0 Introduction

A quantity surveyor is a professional in the built environment who must ensure utilization of the resources of the construction industry rationally by providing the financial management and consultancy service to the client during the construction process (RICS, 1992). However, despite this quantum of responsibilities on quantity surveyors the Nigerian construction industry today is characterized by great numbers of abandoned projects due to excessive cost overruns beyond the client's budget (Boussabaine, 2007).

Even though, the public at large is blaming project consultants, especially quantity surveyors, for this ugly situation. While it may be argued that most construction project in Nigeria suffer cost overrun because inflationary trends cannot be accurately forecast, this does not absolve professional quantity surveyors of the responsibility to produce preliminary estimates that predicts the project cost accurately, if all things run well (Aibinu and Pascol, 2008). Preliminary cost estimate, even though its preparation is based on the quantum of information available and the method used but the level of the accuracy is mostly hinged on the experience of the quantity surveyor. The experience in quote is subjective to human judgement and reasoning skill.

This can only add to the challenge of quantity surveyors to sharpen their estimating skills to overcome the obstacles to estimating accuracy. It is against this background that this study investigates the study of Heuristics behaviour and quantity surveyors preliminary cost estimates accuracy.

## **2.0 Heuristics Behaviour**

Khaneman and Tversky (1974) in their studies of “availability heuristics” defined heuristics as mental functions that makes individual to make decision under a context of uncertainty or scarcity. They stressed further that people have limited capacity for mental work and that in order to deal with a complex and fast changing world they have developed a number of simple modes of reasoning known as heuristic even though this can lead to error and bias.

Heuristic in other words, is the use of simplifying shortcut or rules of thumb by humans in solving complex problems, in addition, heuristics is seen to be mental shortcut that are used to simplify otherwise difficult problems or task (Friedlander and Stockman,1983). This essence is as a result of the limited storage capacity of the short term memory function which is the focus of problem solving in humans and slow and tedious indexing system of the long term memory.

The adoption of behavioural research has expanded the traditional boundaries of real surveying research. (Adegoke, 2006). The real surveying discipline has therefore become more collaborative and more interlinked into some other fields of knowledge. The built environment and other related discipline such as economics, quantity surveying, marketing, management, law, engineering, planning, and architecture. The frontiers of these traditional boundaries have now been extended in behavioural research to cognitive psychology. (Tversky and Kahnemann, 1974).

Heuristic behaviour has been justified in quantity surveying practice, the research envisaged that the greater the level of post qualification experience of the researcher, the more he would potentially depend on such experience (using heuristic shortcut) rather than on thorough market survey.

## **3.0 Forms of Heuristics Behaviour**

### **3.1 The Representative heuristic**

Representative heuristic is used when making judgment about the probability of an event under uncertainty. It is one of a group of heuristic (simple rules governing judgments or decision making) proposed by the psychologists in the early 1970s. It is described as cognitive process through which individuals considered how similar a given event, person or process is to a family of events, persons or processes. Marques de Sa (2001) and Roberts (2004) likewise described representative heuristics as cognitive process through which an individual seeks to identify given characteristics with associated stereotype. In contrast, human brains are believed to have particularly gifted in identifying and seeking patterns in data which can then be erroneously interpreted as evidence of casual relationship, as such leading to error and bias.

In addition to this, Godwin and Wright (2004) posited that representative heuristics had biases associated with it, among which are perception biases: which include ignoring probability base rate frequencies associated with an estimate and that of regression to the mean; which is applicable when an individual maintain a perception that when an event follows another unlikely events, that subsequent events would continue to be unlikely.

This form of heuristic behaviour is applicable to preparation of preliminary estimates where an estimator would probably compare the current design at hand with similar design that was handled by the estimator or other estimators and thereby draw conclusion as to what the cost estimates should be.

### **3.2 Availability Heuristics**

The availability heuristic is a mental shortcut that relies on immediate examples that comes to a given person’s mind when evaluating a specific topic, concept, methods or decisions. The availability heuristic operates on the notion that if something can be recalled, it must be important, or at least more important than alternative solutions which are not as readily recalled (Gallos, 2006). Subsequently under the availability heuristic people tend to heavily weigh their judgment toward more recent information, making new opinions bias toward the latest news. The availability of consequences associated with an action is positively related to the perceptions of the magnitude of the consequences of that action. In other word, easier is to recall the consequences of something the greater those consequences are often perceived to be. Most notably, people often rely on the content of their recall if its implications are not called into question by the difficulty that they experience in bringing the relevant material to mind.

However, being able to recall an event does not guarantee it to be more or less likely to actually occur. There should be a correlation between the two variables but there is no empirical of such (Grant, 2010) hence the availability heuristics cannot be absolutely right in decision making.

### **3.3 Anchoring and Adjustment heuristic**

Anchoring is a cognitive heuristic in which decision are made based on an initial anchor, It provides quick estimates, though, sometimes inaccurate for decisions about uncertain event. The anchoring and adjustment heuristic describes cases in which one uses a quantities or a value as a starting point, known as an anchor, and adjust said information until an acceptable estimates or value is reached (Carr, 2005). Some anchors are self-generated by participants and other anchors are provided by an experimental or another external source (Friedman, 2004). As suggested by Tversky and Kahneman (1974) who first identified this heuristic in 1974 that adjustments are typically insufficient and are often too close to the original anchor.

When that anchor is provided by an experiment or by an outside source, participants engage in two steps process in which they are first asked to make comparative assessment. In many situations, people make estimate by starting from an initial value that is adjusted to yield the final answer. The initial value or starting point may be suggested by the formulation of the problem, or it may be the result of partial computation. In the same vein, Lewis (2011) likewise asserted that adjustment are not sufficient and that different starting point yield different estimate which are bias.

Likewise, anchoring and adjustment heuristics are often use in arriving at preliminary estimates of construction projects. Where an estimator would make a decision based on the initial estimates of similar projects and make some necessary adjustment to take care of variance in the design, location, finishing, cost of materials, labour and equipment, prevalent circumstances surrounding the proposed project to arrive at an estimates.

To an extent, the estimate might be accurate but this is relative, depending on the source of the initial estimate (anchor) and experience of the estimator in adjusting the initial estimates to meet the prevalent circumstances and arrive at the preliminary estimate.

### **4.0 Significance of Quantity Surveyor's Preliminaries Cost Estimate**

A quantity surveyor is a professional who attempt to ensure the resources of the construction industry and utilize to the best advantage by providing the financial management and consultancy service to the client during the construction process (RICS, 1992). However, Seeley (2010) highlighted the services provided by quantity surveying as; preliminary cost advice, cost planning and cost checking advice on contracting methods, construction procurement system, valuation of construction works, preparing tender document and negotiating contract prices, preparing contract document and participating in contract administration, preparing cash flow forecasts and exercising cost control over the project value management, interim valuations and payments, financial statement variations, final account preparation and agreement, project management, settlement of contractual claims and giving expert evidence in arbitrations and disputes (Seely, 2010). Quantity Surveyors provide these services on a wide range of projects including building construction, civil and structural engineering and other engineering services Flyberg, Holms and Buhl (2002).

The significance of Quantity Surveyor preliminary estimate cannot be over emphasized when it comes to the decision to be made on budget for construction works, in arriving at the budget heuristics might come to play. The use of heuristics often distinguishes experts from novice in decision making behaviour and generally improving the efficiency of the decision making process (Hardin, 1997). In certain circumstances, however, heuristic use can lead to biased or inefficient decision especially when it comes to the issue of finance. Whereas, accuracy of cost estimate is significant to all parties associated with construction works, more importantly accuracy of the quantity surveyors preliminary estimate is one of the keys to a successful project delivery and at large, successful investment (Diaz, 2002).

Much more importantly to the successful delivery of government projects as governments relied much more on quantity surveyors preliminary cost estimates to prepare budgets for proposed construction projects. The projects which may not be for the purpose of citizens benefits alone (dividend of democracy) but as well for investment purposes.

The premise of this research is that the potential for variance exists in every preliminary estimating, but in some cases, this variance is excessive, i.e. it is higher than what it is expected. However, preparation of preliminary cost estimate like all predictions invariably contains some amount of errors and inaccuracies which may due to imprecision or uncertainties inherent in the particular project environment. In order to minimize this problem, this might lead to quantity surveyors resulting into heuristic.

Odeyinka and Yusuf (2003) likewise assessed the accuracy of quantity surveyors preliminary cost estimate in Nigeria where they reported that quantity surveyors preliminary cost estimates in Nigeria were not significantly biased but the consistency of the estimates was found to be unsatisfactory.

## **5.0 Research Methodology**

Research methodology is the process used to collect information and data for the purpose of making decisions. Purposive sampling is chosen according to the discretion or judgment of an expert who is familiar with the relevant characteristics of the population. Hence the researcher adopted purposive sampling to choose eighty (80) quantity surveyors in the study area who were willing to co-operate and fitted into the defined population. Data were collected by means of questionnaires design and distributed to the quantity surveyors asking the respondents to identify their areas of specialization, awareness, types and level of usage of heuristics behaviours by the quantity surveyors. Likewise, characteristics and factors influencing the usage of heuristics behaviour and its influence on the accuracy of quantity surveyor's estimates. 50 questionnaires were properly filled and fit for analysis, this represents 62.5 percent response rate. Likert scale type 4 – 1 was used to determine the mean where score 4 represents strongly agreed, 3 represents agreed, 2 represents disagreed while 1 represents strongly disagreed.

The study area for this study is Ibadan, the capital city of Oyo State, it is the south western part of the state and in the south western Nigeria, located at about 128km inland northeast of Lagos and 530km southwest Abuja Federal Capital. The population is 2,550,593 people according to 2006 population census with 11 local government areas. This study area was chosen because there are significant numbers of quantity surveyors both in the consultancy firms, public services, construction firms and academics in which information relevant and useful for this study would be easily accessible.

## **6.0 Data Analysis and Discussion of Findings**

### **6.1 Reliability of Data Collected**

Out of 80 questionnaires distributed to the quantity surveyors in the study area, 50 questionnaires which was 62.5 percent were collected and analysed as shown in Table 1, this showed a good representation of the target population.

Table 1, showed the description of organization in which 34 (68%) of the respondents were working with consulting companies, 10 (20%) working with construction firms while 06 (12%) working with public establishment.

This result indicated that majority of the respondents were quantity surveyors which had their experiences with consulting and construction firm's arms of organizations which was of utmost importance to this study. In addition, 50.0% of the total respondents were from large category of organization, while the remaining 25 respondents which comprises of 50.0% of the total respondents were from medium organization as indicated in Table 2. This results showed equal representation of large and medium categories of size of the organization, an indication that decision from these set of respondents would be found to be reliable.

Table 1. Description of Organization

Organization	No Distributed	Frequency of Response	Percentage
Consulting firms	40	34	68
Construction firms	20	10	20
Public establishment	20	06	12
Total	80	50	100

Source: Field Survey, 2016

Table 2. Category of Organization

Organization	Frequency of Response	Percentage
Large	25	50
Medium	25	50
Small	0	0
Total	50	100

Source: Field Survey 2016

Table 3 depicts years of establishment of the respondents where 6-10 years had frequency of 3 and (6%), 11-15years had frequency of 19 (38%), 16-20 years had frequency of 13 (26%) and above 20 years had frequency of 15 (30%). This is an indication that the establishment where the majority of the respondents were working had wealth of experiences that can be considered to be reliable for this study. Since majority of the establishment had been in existence over 11 years and above.

Table 3. Years of Establishment

Years	Frequency of Response	Percent
6-10years	3	6.0
11-15years	19	38.0
16-20years	13	26.0
Above 20 years	15	30.0
Total	50	100.0

Source: Field Survey 2016

It was also discovered from the study that the majority of the respondents had Higher National Diploma (HND) and Masters of Science (M.Sc) as their highest educational qualification, in addition to this 52% (MNIQS) and 10% (FNIQS) were associate members and fellow of Nigerian Institute of Quantity Surveyors professionally qualified as shown in Tables 6.5 and 6.6. It can be inferred from Table 4 that 26 respondents (52%) specialized on preliminary cost estimate, 3 respondents (6%) on cost planning, 2 respondents (4%) specialized on cost estimate, 3 respondents (6%) specialized on contract administration, 15 respondents (30%) specialized on preparation of BOQ, while only 1 respondent (2%) specialized on Arbitration.

Table 4. Highest Educational Qualification

Qualification	Frequency of Response	Percentage
ND	4	8.0
HND	17	34.0
PGD	3	6
B.Sc / B.Tech	3	6
M.Sc	21	42.0
Ph.D	2	4.0
Total	50	100.0

Table 5. Professional Qualification

Grade of Profess Qualification	Frequency of Response	Percentage
Graduate	18	36.0
Probationer	1	2.0
MNIQS	26	52.0
FNIQS	5	10.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

The result of Table 6 is in line with the objectives of this study, as this preparation of preliminary cost estimates is one of the areas of specialization where heuristic behaviour was being put into use. Likewise, preparation of preliminary cost estimates is the initial stage in Registered Institute of Building Association (RIBA) plan of work where the services of Quantity surveyors are very significance as in preparing the mind of the client as to his financial commitment to the proposed project work.

Table 6. Area of Specialization

Area of Specialization	Frequency of Response	Percentage
Preliminary Cost Estimates	26	52.0
Cost Planning	3	6.0
Cost Estimates	2	4.0
Contract Administration	3	6.0
Preparation of BOQ	15	30.0
Arbitration	1	2.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Considering the followings; year of experience, highest educational and professional qualifications, category, types of organization, area of specialization of the respondents, an inference can be made that the data obtained for this study was adequate and reliable.

### 6.2 Awareness, Types and Level of Usage of Heuristics among Quantity Surveyors

The results of the study affirmed that all the respondents (100%) were aware and also make use of heuristics in the practice of quantity surveying as indicated in Table 8. This is contradicting the submissions of Adegoke & Aluko (2007) and Gallimore (1994 & 1996), that the study of heuristic behaviour has recently been infused in real estate researches nevertheless, the result of this study is affirming that Quantity surveyors do make use of heuristic behaviour in their professional practice even though it may not be well understood that such rule of thumb is referred to as heuristics.

Table 7. Heuristics Types, Awareness and Level of Usage

SN	Heuristic Type	Awareness				Mean	Rank	Usage				Mean	Rank
		4	3	2	1			4	3	2	1		
1	Representativeness	14	25	11	-	17.0	2nd	6	39	3	-	17.2	2nd
2	Availability	30	18	2	-	19.8	1st	25	21	4	-	19.0	1st
3	Anchoring & Adjustment	10	19	16	5	13.4	3rd	34	8	4	4	13.8	3rd

### 6.3 Characteristics and Factors Influencing the Use of Heuristics in Quantity Surveying Profession

Tables 8 shows the characteristics of heuristic behaviour used by Quantity surveyor in arriving at preliminary cost estimates. Assessing similarities of elements of building/elements had mean of 18.1 and ranked 1<sup>st</sup> position, immediate examples that comes to mind had mean of 17.1 and ranked 2<sup>nd</sup> position, using a figure/ estimate at a starting point had mean of 16.9 and ranked 3<sup>rd</sup> position, reliability on recent information had mean of 15.1 and ranked 4<sup>th</sup> position, anchoring on design/ element of work more representatives had mean of 13.9 and ranked 5<sup>th</sup> position. This indicates that assessing similarities of element of building/object is mostly used by Quantity surveyors in arriving at preliminary cost estimate.

This may be as simplicity in usage of the characteristics of heuristic behaviour. Since, at preparation of preliminary cost estimates, the detailed contract documents such as architectural drawings and structural drawings would not have been available then, the basis of preparing cost estimates would be on the information available about the project and assessment of similar projects. Therefore, the result of this study is in conformity with the common practice. Hence, the validity of this result with the literature that established that preliminary cost estimate determines the viability of public projects (Adegoke, 2011).

Table 8. Characteristics of Heuristics Behaviour used by Quantity Surveyors in arriving at Preliminary Cost Estimates.

Characteristics of heuristic behavior	S.A 4	Agree 3	Disagree 2	S.D 1	Mean	Rank
Using figure/estimate at a starting point	10	32	8	-	16.9	3 <sup>rd</sup>
Assessing similarities of elements of building/ object	16	31	3	-	18.1	1 <sup>st</sup>
Immediate examples that comes to mind	16	22	12	-	17.1	2 <sup>nd</sup>
Reliability on recent information	20	12	17	1	15.1	2 <sup>nd</sup>
Anchoring on design/ elements of work more representatives	5	30	14	1	13.9	5 <sup>th</sup>

Factors influencing the use of heuristics in preparation of preliminary cost estimate as identified in Table 9 are; lack of experienced Quantity surveyors carrying out cost estimating had mean of 18.6 and ranked 1<sup>st</sup> position, level of experience of Quantity surveyor had mean of 17.6 and ranked 2<sup>nd</sup> position, lack of consultation with experience Quantity surveyor had mean of 17.4 and ranked 3<sup>rd</sup> position, lack of sufficient information/data had mean of 17 and ranked 4<sup>th</sup> position, interpretation of information and Quantity surveyors working outside their normal location both had mean of 16.1 and ranked 5<sup>th</sup> position, time pressure had mean of 14.3 and ranked 6<sup>th</sup> position, difference opinion had mean of 12.9 and ranked 7<sup>th</sup> position, sharp practices had mean of 11.7 and ranked 8<sup>th</sup> position, age of historical data had mean of 11.6 and ranked 9<sup>th</sup> position. This is an indication that majority of the respondents strongly agreed that lack of experience of Quantity surveyors carrying out cost estimating may affect or lead to bias in heuristic behaviour due to lack of Quantity surveyor’s experience.

Table 9. Factors Influencing the Use of Heuristics

Factors	4	3	2	1	Mean	Rank
Pressure	6	32	11	1	14.3	7 <sup>th</sup>
Experience of Q.S	36	8	2	4	17.6	2 <sup>nd</sup>
Interpret of Inf	38	10	1	1	16.1	6 <sup>th</sup>
Q.S working outside normal location	19	26	2	3	16.21	5 <sup>th</sup>
Lack of exp of Q.S	39	9	1	1	18.6	1 <sup>st</sup>
Lack of consultation	21	13	5	1	17.4	3 <sup>rd</sup>
Difference of opinion	3	27	16	4	12.9	8 <sup>th</sup>
Sharp practices	5	11	20	4	11.7	9 <sup>th</sup>
Lack of sufficient data	31	10	7	2	17.0	4 <sup>th</sup>
Age of historical data	1	22	19	8	11.6	10 <sup>th</sup>

Source: Field Survey 2016

Table 10 reveals the use of heuristics and level of the accuracy of preliminary cost estimates; where availability heuristics had mean of 19 ranked 1<sup>st</sup>, representative had mean of 17.5 ranked 2<sup>nd</sup> while anchorage and adjustment had 13.8 and ranked 3<sup>rd</sup> and their accuracies in determining preliminary estimates followed the same pattern. Meaning that application of representative heuristics offered most accurate preliminary cost estimate than other two types.

The implication of this result is that quantity surveyors likewise make use of short cut method based on their previous experience and beliefs in arriving at the preliminary estimates. The literature affirmed that once this type of behaviour had been learned, it may be very hard to desist from it hence a confirmation for ranking 1<sup>st</sup> of availability heuristics in this study. Anchoring and adjustment heuristic had mean of 13.8 and ranked last which is 3<sup>rd</sup> position. This is an indication that this type of heuristic was seldom used in quantity surveying practice which showed a conformity with Adegoke & Aluko 2007; Ogunba and Ojo 2007 that anchoring and adjustment heuristic is in its infancy state and predominant in unfamiliar location of operation.

The study likewise affirmed that availability heuristics gives most accurate preliminary cost estimates having mean of 18.6 and ranked 1<sup>st</sup>, followed by representative and anchorage and adjustment heuristics.

Table 10. Heuristics and Impacts on Preliminary Cost Estimates Accuracy

S/N	Heuristics	Accuracy of Preliminary Cost Estimates				Mean	Ranking	Remarks
		4	3	2	1			
1.	Representatives	8	37	5	-	17	2nd	
2.	Availability	23	21	6	-	18.6	1st	
3	Anchoring & Adjustment	4	27	17	2	13.3	3rd	

Source: Field Survey 2016

#### 6.4 Effects of Use of Heuristics Behaviours' in Preparation of Preliminary Cost Estimates

Table 11 shows the effects of heuristic behaviours in preliminary cost estimates where; reduction in time of contract administration had mean of 17 and ranked 1<sup>st</sup> position, inefficient decision had mean of 16.1 and ranked 2<sup>nd</sup> position, reduce effort in arriving at reliable estimate had mean of 16 and ranked 3<sup>rd</sup> position, over estimation as a result of inability to accurately predict the likelihood of an event had mean of 15.5 and ranked 4<sup>th</sup> position, neglect of relevance base had mean of 15.2 and ranked 5<sup>th</sup> position, easy computation of construction had mean of 15 and ranked 6<sup>th</sup> position, inconsistency of the estimates and inaccuracies/errors had mean of 14.7 and ranked 7<sup>th</sup> position, simplify design making had mean of 14 and ranked 8<sup>th</sup> position, cognitive bias had mean of 13.1 and ranked 9<sup>th</sup> position. Even though, the result indicated that majority of the respondents strongly agreed that there is time reduction on contract administration as a consequence of heuristic behaviour in Quantity surveyor's estimates. Nevertheless, the respondents conceded that all the benefits identified were significant having overall remark of agreed with average mean of 3.

Table 11. Effects of Heuristics Behaviour on Q. S's Preliminary Cost Estimate

Effects	S.A 4	Agree 3	Disagree 2	S 1	Mean	position
Over estimation as a result of inability to accurately predict the likelihood of an event	11	34	4	1	15.5	4th
Neglect of relevance base	13	27	9	1	15.2	5th
Cognitive bias	6	20	23	1	13.1	9th
Inaccurate/errors	19	15	10	6	14.7	7th
Inefficient decision	23	18	6	3	16.1	2nd

Inconsistency of the estimates	8	32	9	1	14.7	7th
Reduces time of administration	30	11	8	1	17	1st
Reduces effort in arriving at reliable estimate	21	19	9	1	16	3rd
Easy computation of construction	16	19	14	1	15	6th
Simplify design making	9	24	15	2	14	8th

Source; Field Survey 2016

## **7.0 Conclusion and Recommendations**

On analysis of the data collected on this study, the following were discovered:

- One of the areas of specialization of quantity surveying practice is preparation of preliminary cost estimate, which was also established to be one of the areas where usage of heuristics behaviour is pertinent.
- It was established in the study that quantity surveyors are familiar with heuristic behaviour which is the subject of discussion in this study and the commonly use of heuristic type are availability, representative, positivity and anchoring & adjustment heuristics; but the most commonly use heuristic type by the quantity surveyors was ‘Availability and Positivity’ while ‘Anchoring and Adjustment’ type were seldom used.
- Assessing similarities of elements of buildings/ objects, use of examples that comes to mind at first and use of figure or estimates at starting point among others were most influential characteristics of QS heuristics behaviour.
- Lack and level of experience, lack of consultation with experienced QS and lack of information were established to be responsible for use of heuristics in determining preliminary cost estimates.
- The same ‘Availability type of heuristics’ was equally discovered to be most accurate when adopted to prepare preliminary estimate.
- The use of heuristic behaviour in QS’s estimate reduces time of contract of administration and likewise reduces inefficient decision while cognitive bias and inconsistency of the estimate were the adverse effect of heuristic behaviour.

In the light of the findings of this study, the recommendations advanced regarding the heuristic behaviour and quantity surveyors’ preliminary cost estimates with a view to improving the accuracy of preliminary cost estimates in quantity surveying practice in Nigeria are:

- i) The study revealed that the use of ‘availability heuristics’ is the most accurate when preparing preliminary cost estimates. Availability heuristics which beliefs that if something can be recalled it is more important than alternative solution which cannot be easily recalled therefore experienced and matured quantity surveyors should be involved and in leading the team in preparation of preliminary cost estimates. So that experience gathered over the years can come to play in applying availability heuristics to prepare an accurate preliminary cost estimate
- ii) There should be continuous improvements for pre-design projects and preliminary cost estimation where heuristics behaviour is being put in use by the quantity surveyors; as this will equally enhance giving the client value for money.
- iii) There should be training and re - training education of quantity surveyors on behavioural education and decision making in order to raise the general level of awareness of the potentials of behaviour biasing the results of preliminary cost estimate. This recommendation will reduce the risk of behavioural bias in the practice of quantity surveying profession.

- iv) The leaders of each team in quantity surveying office should be flexible enough to adapt their style to the overall goal of the project which is tantamount to giving client value for money. That is, leaders must be flexibly maximizing the strengths when leading.
- v) Since it was discovered that the use of heuristics behaviours in preparation of preliminary estimates reduces inefficient decision and hereby enhances contract administration time. Therefore, the working attitudes of people involved in preparation of preliminary estimates should be improved in order to make profitable decision so as to enhance the practice of quantity surveying in Nigeria.
- vi) Position of current and accurate data on cost is equally importance, therefore electronics data and hard copy data bank should be well enhanced by the professional bodies in the built environment professions.

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