Optimized Bids Evaluation Model for Improved Performance and Quality Delivery in Public Procurement Sector and Construction Projects

F.O. Aranuwa[1] and TOPE-GABRIELS Bunmi Sade[2]

[1]Department of Computer Science, Adekunle Ajasin Uiversity, Akungba – Akoko, Ondo State, Nigeria

[2]Physical Planning Uniit, Adekunle Ajasin University, Akungba – Akoko, Ondo State, Nigeria

***Corresponding Author:** felix.aranuwa@aaua.edu.ng

ABSTRACT

Traditionally, public sector procurement and construction project contract awards are largely based on the lowest bid award system. However, this practice has been characterized with problems of inferior quality of construction facilities, high incidence of litigations and frequent cost overruns. Therefore, this study is focused at designing an optimized bids evaluation model to overcome the challenges of the traditional methodologies. A multi-parameter bids responsiveness evaluation model that integrates both the mandatory and weighted sub-factors criteria was designed to achieve this purpose. A cross-sectional quantitative and qualitative research technique was employed to formulate the instruments used for the research data collection. Purposive and random sampling techniques were deployed in drawing data samples from respondents to identify cases, make inferences about population, save time and reduce cost of the study. Two hundred and six datasets was collected, 66% of the datasets was devoted to training while the remaining 34% was used for testing during the data modeling. Relative importance index (RII) and ranker's search method was used to measures the strength of relationship between the observed data and ranking of the relative importance indices of the attributes used respectively. Four different classification algorithms, namely: Pruned Decision Tree (PDT), Logistics Model Tree (LMT), Justified Repeated Incremental Pruning (JRIP) and PART were considered in the modeling. The algorithms were tested to determine the model with the best predictive accuracy. From the experiment, the PDT and JRIP outclassed the other two algorithms in the layer. They both have the same correctly classified instances of 99.4%, mean absolute error of 0.062, true positive rate and false positive rate of 0.994 and 0.001 respectively, the ROC Area of 0.994 and recall weighted average of 0.994 respectively. This proves that both algorithms are suitable for the model. However, the pruned decision tree was preferred the best algorithm as a result of the time taken to build the model. The algorithm took 0.01 seconds compared to JRIP with 0.1 seconds. With this performance, the new model will suitably improve the efficiency of the existing methodologies, guaranteed quality delivery and maximum value in any construction projects. Therefore, the model is highly recommended for efficient bid evaluation in the procurement and construction sectors. Meanwhile, the research still paves the way for future research using additional more inputs, larger database and other background factors.

Keywords: Bids responsiveness, Evaluation model, Classification algorithms, Multi-parameter, Quality delivery

Introduction

Bid evaluation system is an integral component of performance in public procurement sector and construction projects. The choice of selecting a contractor or supplier for a project depends on the bid award approach in place, which has a significant influence on the success or failure of such project or services. [1]. Customarily, public procurement and construction projects are largely based on the competitive lowest bid award system. This practice is universally accepted since it ensure the lowest cost of completing a project. However, clients and construction industries have realized that accepting the least bid price does not guarantee maximum value and quality delivery [2]. Hence, the quest for an alternative method to overcome the challenges of the customary practices motivated this research work. The study is focused at developing an optimized model based on bids responsiveness strategy in procurement and construction projects to improve on the conventional approaches. By definition, bid responsiveness is an alternative method that incorporates both the mandatory and weighted sub-factors criteria other than just lowest price system into the selection process [3]. According to [4], a bid is said to be responsive when it substantially complies with the procedures and requirements laid out in the bidding documents.

2.0 Literature Review

2.1 Overview of Bidding and Bid Evaluation System

Bidding is the most common means by which contractors or suppliers submit proposal to obtain contracts and services [5]. Meanwhile, the choice of selecting a contractor or supplier for a contract or service depends on the bid evaluation strategy, which has a significant contribution to the success or failure of the project, particularly in the procurement and construction sectors [6]. According to [7], bid evaluation is defined as the organized process of examining and comparing bids to select the best offer in an effort to acquire goods and services necessary to achieve the goals of an organization. The main purpose of bid evaluation is to determine the most economically advantageous tender.

2.2 Bid Evaluation Approach

The three main bid evaluation strategies presented by [8] are discussed as follows:

2.2.1 Lowest bidding

Lowest bidder approach is a common method applied for selection of contractors in many procurement and construction projects [9]. It is a bidding methods in which the party that bids at the lowest price is determined as the successful bidder. This type of bidding compels contractors to lower their costs to ensure that they win a bid. However, a project awarded based on the least price has its own inherent flaws. The practice has been characterized with continuous problems of inferior quality of construction facilities, high incidence of claims and litigation, frequent cost overruns and use of poor quality of materials. According to [10], the abolition of the lowest bidding system is under discussion as it is pointed out to be one of the major causes for deteriorating construction companies' profitability and poor-quality delivery.

2.2.2 Responsive Bid

A responsive bid is referred to a bid or proposal that substantially complies with the invitation to bid or request for proposals with all prescribed bid conditions [3]. According to [11], a responsive bid or tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material or qualification deviation.

A responsive bid is expected to meet all the criteria laid out in the bidding documents. The components of the criteria include product specifications, deliverable, prescribed bid conditions and submittal deadlines [8]. According to [1], the substantially lowest evaluated responsive bid may or may not necessarily be the lowest priced bid. But, to determine a fully responsive bid, a logical systematic evaluation procedure designed must cover all aspects of bid criteria (Frayda, 2002). A responsive bid could fall in to one of these categories:

- Fully Responsive/Fully Compliant: A bid is said to be fully responsive, if the bid submitted by a bidder is entirely in accordance with the requirements and criteria given in the bid document.
- Substantially Responsive/Substantially Compliant: A bid is substantially responsive when the bid is 'to a large extent' in accordance with the requirements/criteria given in the bid document. Such bid must be without material deviation, reservation, or omission.
- Non-Responsive/Non-Compliant: A bid is said to be non-responsive or non-complaint, if there is any deviation from the required solicitation, or a failure to supply required information or fill in line items on the bid schedule. Any deviation from the requirements of the bid documents is considered non-responsive and should be rejected.

2.2.3 Responsible Bidder

A responsible bidder is a business entity or individual who has the financial and technical capacity to perform the requirements of the solicitation and subsequent contract. He is a bidder that has the experience, integrity, personnel, and equipment to perform the requirements for a contract. The requirements to be a "responsible" bidder vary from owner to owner. However, common issues related to a bid responsiveness include bid submission prior to the bid submittal deadline [3].

2.3 Bids Evaluation Criteria

Evaluation criteria are the standards against which bids are evaluated. Generally, evaluation criteria are categorized into three categories, these include (i) mandatory criteria, (ii) weighted criteria and (iii) weighted criteria with mandatory elements.

(i). Mandatory criteria are used in straight forward bid evaluation methods where they are rated as pass or fail, responsive or non-responsive or comply or non-comply. They are usually used in evaluation for goods procurement and infrastructure projects. The mandatory criteria are the first criteria against which bids are evaluated in order to eliminate bids that do not conform to requirements, especially the product specifications and submittal deadlines [8].

(ii). Weighted criteria are criteria which can be measured in terms of degree of responsiveness. The scale used to measure the degree of responsiveness depends on the procurement method and category of procurement. In accordance with the Procurement Act (section 5) of Nigeria, the following describes the weighted criteria principles in establishing the qualifications of suppliers and contractors. Those that are considered appropriate include:

(a) Technical competence, financial resources, facilities, reliability, experience and reputation of product and personnel to perform the contract
(b) Legal capacity
(c) Solvency
(e) Fulfillment of tax and social security obligations
(d) Absence of criminal record
(f) Satisfactory past performance

(iii). Weighted criteria with mandatory elements are criteria that combined both mandatory minimum requirements defined and weighted criteria. Bid evaluation approach may require different methods and parameters (e.g., using merit point or scoring systems). An effective bid management and tender process is expected to provide a positive evaluation approach that leads not only to the appointment of appropriate suppliers, but also ensures maximum value and quality [13]. A wholly balanced and highly efficient bid and tender management process is expected to improve the quality of supplies, minimize costs and manage project risks. .

This present study assesses the bids criteria and their index factors. The research also considered existing works on lowest bidding system [2]; [9]; [10]. Most of the study focused only on investigating the effects of lowest bid award system on contractor's efficiency and performance. The work that was used as a benchmark developed a support decision-making system for contractor selection in construction projects based on individual indicators and collaborative indicators [14]. These indicators were used to formulate the problem as a binary optimization problem. The work indeed added value to the body of knowledge, but did not address the challenges of the conventional methodologies. Hence, the need for this optimized model.

3. Research Methods and Material

3.1 Research Design and Approach

This study employed quantitative and qualitative research techniques to formulate the instruments used for the research data collection. Purposive and simple random sampling technique was adopted to draw samples from respondents who have good knowledge and experience about the subject in question, more importantly looking at the nature of building construction industry, the study seeks to solicit information from a section of the population of contractors, consultants, clients and other related professionals who have experience in building construction. The first section of the research instrument present demographic information with respect to gender, age, academic background, professional background of respondents, years of experience in building construction, rank and positions. This aspect was deemed necessary in order to ascertain the reliability and credibility that the information gathered are from experts and professionals in the domain. The second section of the instrument presents research questions using five-point likert scale to collate responses from experts and professionals indicating their level of support to the factors affecting the responsiveness of bids in construction projects. Respondents were requested to answer the research questions in section B measuring the level of support on a five-point likert scale. The third section of the instrument was specifically designed to acquire and assess the compliance of some past projects executed by bidders as per the various criteria listed in the bidding documents based on the logical Yes/No. This section was purposefully administered to selected professionals including Directors of Works and Physical Planning who directly supervised such projects. The study was conducted in selected tertiary institutions and related parastatals in the Western region of Nigeria.

3.2 Data Collection

The main part of the research study is the collection of required data, which were obtained through questionnaire survey developed for the study and personal interviews from the targeted population. The researcher collected a total sample data of 206 as the actual number of respondents. The total number of two hundred and fifty (250) copies of research questionnaire was distributed, 224 were completed and returned, representing 89.6% response rate. The returned copies were scrutinized for errors, omissions, completeness and inconsistencies, and two hundred and six (206) questionnaires were found to be adequately completed representing 82.4%.

3.3 Data Presentation and Analysis

Tables 1 presents the assessed factors that affects the responsiveness of bids in construction projects. All respondents (contractors, clients and consultants) were asked to indicate their agreement regarding these factors in Section B of the research questionnaire on the likert scale of 1 to 5. The mean and standard deviation of the aggregated agree and disagree variables from the responses were calculated and corresponding relative importance index (RII) computed using equation 1.

$$\text{Relative importance index (RII)} = \frac{\sum w}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$ ……………………....Equation (1)

W is the weight given to each factor by the respondent, ranging from 1 to 5;

n_1 = number of respondents for strongly disagree;

n_2 = number of respondents for disagree;

n_3 = number of respondents for fairly disagree;

n_4 = number of respondents for agree;

n_5 = number of respondents for strongly agree;

A is the highest weight (i.e. 5 in the study);

N is the total population; and

The *RII* ranges from 0 to 1.

Table 1: Assessing Factors affecting responsiveness of bids in construction projects

Research Question	SA	A	FD	D	SD	Aggregated Agree	Aggregated Disagree	RII	Rank
RQ1	154	49	0	3	0	203	3	0.943689	1
RQ2	146	56	0	4	0	201	4	0.933981	4
RQ3	152	46	3	5	0	198	5	0.934951	3
RQ4	148	49	2	7	0	202	4	0.928155	8
RQ5	147	50	3	6	0	199	4	0.928155	9
RQ6	135	62	2	6	1	200	4	0.914563	14
RQ7	146	50	5	5	0	200	5	0.927184	10
RQ8	145	55	1	5	0	197	7	0.930097	7
RQ9	146	54	2	3	1	197	6	0.931068	6
RQ10	144	55	2	3	2	196	5	0.926214	11
RQ11	151	50	1	4	0	199	5	0.937864	2
RQ12	147	48	1	10	0	200	4	0.92233	13
RQ13	139	61	2	4	0	195	10	0.925243	12
RQ14	128	51	2	23	2	197	7	0.871845	15
RQ15	150	49	3	2	2	179	25	0.93301	5
Mean value						***197.8***	***6.4***		
Standard Deviation						***5.75***	***5.75***		

3.3.1 The Multi-Parameters Criteria Variables for the Model Building

The multi-parameters criteria evaluation variables are of two levels: the mandatory criteria and the weighted sub-factors criteria as presented in Table 2: Table 3 presented the multi-parameters model format.

Table 2: The Multi-Parameters Criteria Evaluation Variables

S/N	CRITERIA	LABEL
A	**MANDATORY CRITERIA**	
1	Meets Submittal Deadline & Project Specification Determination	MSD
2	Is the Lowest bid responsiveness (Bids conforms " Substantially" to the bid specification)	LBR
B	**WEIGHTED AND SUB FACTORS CRITERIA**	
3	Has a history of satisfactory performance	HSP
4	Has good reputation regarding integrity (No petitions for bankruptcy by contractor or principals of contractor)	GR
5	Evidence of financial capability to execute the project by submission of reference letter from a reputable commercial bank in Nigeria indicating willingness to provide credit facility for the execution of the project when needed.	FC
6	Has adequate equipment and facilities for the contract?	AEF
7	Able to deliver according to the contract schedule/bids documents?	ATD
8	Evidence of Certificate of Incorporation issued by Corporate Affairs Commission (CAC) including forms CAC2 and CAC7 or (CAC1.1).	CAC
9	Evidence of company income tax clearance for the last 3 years valid till December 31st of the year award or year in question.	TAX
10	Evidence of current pension compliance certificate valid till December 31st of the year in question.	PEN
11	Evidence of current Industrial Training Fund (ITF) compliance certificate valid till 31st of the year in question.	ITF
12	Evidence of current Nigeria Social Insurance Trust Fund (NSITF) compliance certificate valid till December 31st of the year in question.	NSITF
13	Evidence of registration on the National Database of Federal Contractors, Consultants and Service providers, and submission of Interim Registration Report (IRR) with valid certificate issued by BPP till 31st of the year in question.	NDF
14	Sworn Affidavit disclosing whether or not any officer of the relevant committees of the Tertiary Institution or the Bureau of Public Procurement is a former or present directors, shareholders or has any pecuniary interest in the bidder and to confirm that all information presented in its bid are true and correct in all particulars.	BPP
15	Letter of Authorization as representatives of the original equipment manufacturers (OEMs).	OEM
16	Company Audited Accounts for the last 3 consecutive years	CAA
17	Company's profile with the curriculum vitae of the key staff to be deployed for the project including copies of their academic/ professional qualifications.	CPV
18	Verifiable documentary evidence of at least three (3) similar jobs executed in the last five (5) years including letters of award, evaluation certificates, job completion certificates and photocopies of the project.	JEC

Table 3: Multi-Parameters Model Format

Bidder	MSD	LBR	HSP	GR	FC	AEF	ATD	CAC	TAX	PEN	ITF	NSITF	NDF	BPP	OEM	CAA	CPV	JEC	PREDICTION
B1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	QUALIFIED
B2	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	QUALIFIED
B3	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NQ
B4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	PQ
B5	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	REJECTION
B6	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	REJECTION
B7	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	NQ
B8	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	NQ
B9	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	PQ
B10	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	NQ

3.4. Model Building Experiment

In the experiment, attribute importance analysis was carried out to rank the attributes used in the study. Information Gain and Gain Ratio attribute evaluators were used on the Waikato Environment Knowledge Analysis (WEKA) platform to rank the relative importance indices of the attributes. The Ranker's Search method was used to achieve this. Out of the eighteen (18) criteria identified, it is observed that the attribute with label MSD (deadline submission and determination of the lowest bid responsiveness) was ranked the first with 0.7692 value in the information gain ratio ranking on the WEKA experiment, followed by the other attributes as presented in Table 4. Figure 1 and Figure 2 depicts the Information Gain and Gain Ratio ranking from the WEKA platform respectively. Figure 3 depicts the graphical comparison of the ranking.

Table 4: Attributes Ranking using Information Gain and Gain Ratio

Information Gain Ranking			Gain Ratio		
Ranked Attributes	**Value**	**Rank**	**Ranked Attributes**	**Value**	**Rank**
MSD	0.7692	1	MSD	1	1
JEC	0.6691	2	JEC	0.943	2
TAX	0.6252	3	TAX	0.678	3
NDF	0.6252	4	NDF	0.678	4
FC	0.2922	5	FC	0.412	5
GR	0.2922	6	GR	0.412	6
LBR	0.1834	7	HSP	0.269	7
HSP	0.1093	8	LBR	0.206	8
NSITF	0.010	9	NSITF	0.010	9
ATD	0.010	10	ATD	0.010	10
AEF	0.010	11	AEF	0.010	11
CAA	0.010	12	CAA	0.010	12
OEM	0.010	13	OEM	0.010	13
CPV	0.019	14	CPV	0.196	14
BPP	0.019	15	BPP	0.196	15
ITF	0.019	16	ITF	0.196	16
PEN	0.019	17	PEN	0.196	17
CAC	0.019	18	CAC	0.196	18

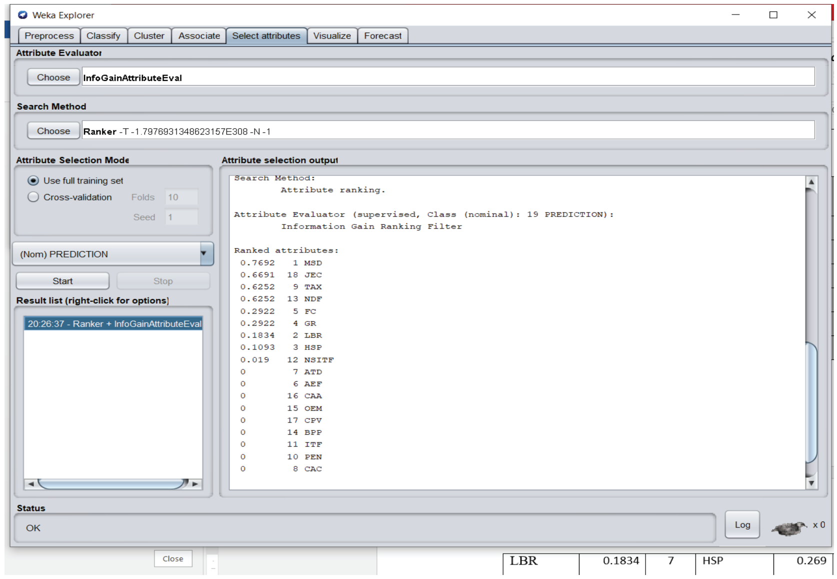

Figure 1: Information Gain Ranking Information

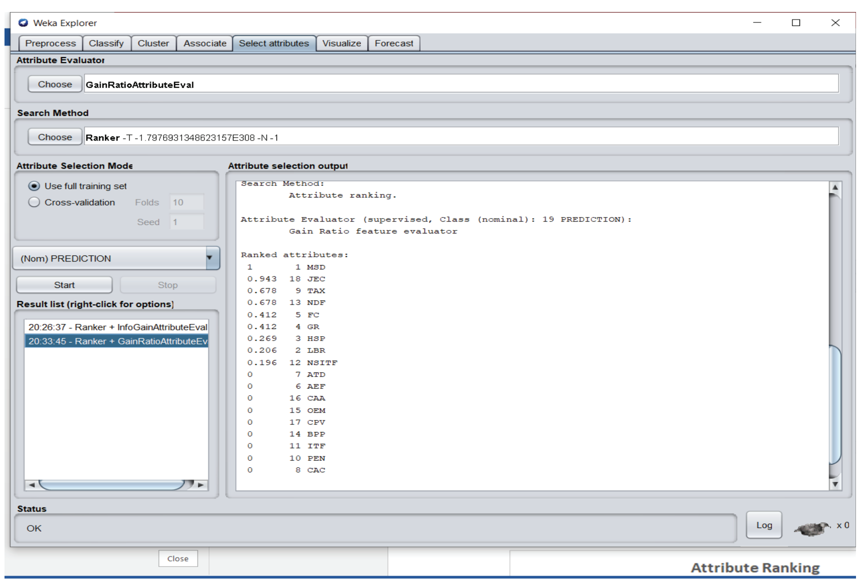

Figure 2: Gain Ratio Ranking Information

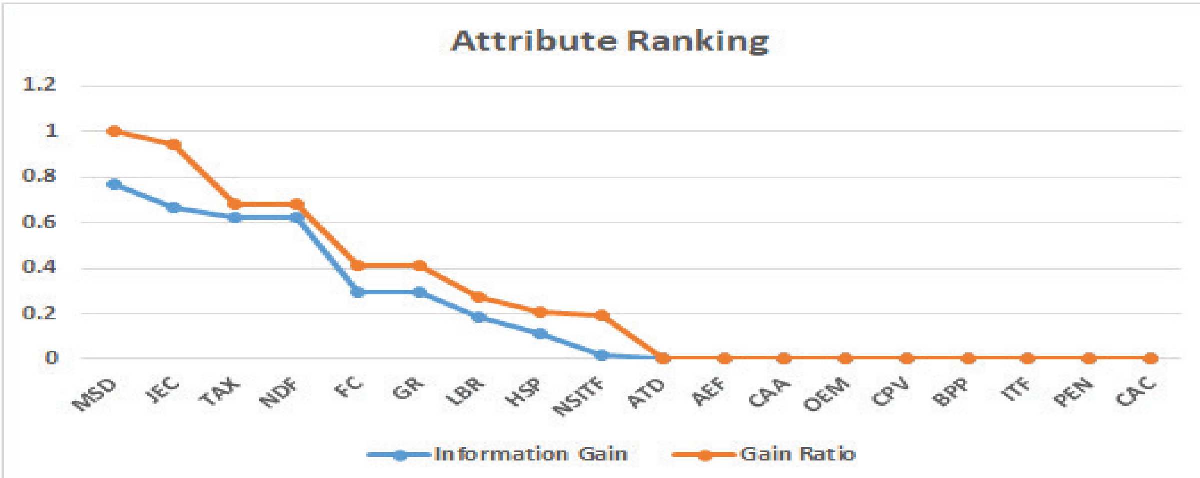

Figure 3: Information Gain and Gain Ratio Ranking Chart

During the model building, the datasets for the experiment was divided into two. By default 66% of the datasets was devoted to training while the remaining 34% was used for testing of randomly selected new data. Ten (10)-fold cross validation test mode also was used to validate the modeling. The 10-fold cross-validation test mode was considered the best since it produced the best model. The 10-fold cross validation mode have been widely used, and it is described a better option to determine the performance of a classifier [15]. Four (4) different classification algorithms from two classifier family of Decision Tree and Rule Inductions were used for the modeling. The Pruned Decision tree and Logistics Model Tree (LMT) belong to the Decision Trees family, while Justified Repeated Incremental Pruning (JRip) and PART belongs to Rule Inductions. The classifiers were tested on the datasets to determine the classifier that best models the data with best predictive accuracy. The performance of the algorithms based on the two modes was carried out using standard metrics of accuracy, precision, recall and f-measure for classification as shown in Table 5.

Table 5: Performance Metric for all the classifiers considered in the modeling

Classifiers	Pruned Decision Tree		LMT Logistics Model Tree		JRIP Justified Repeated Incremental Pruning		PART	
Measure Evaluation	10 fold - Cross-Validation	Percentage Split (66/34)%	10 fold - Cross-Validation	Percentage Split (66/34)%	10 fold - Cross-Validation	Percentage Split (66/34)%	10 fold - Cross-Validation	Percentage Split (66/34)%
Total Number of Instances	160	54	160	54	160	54	160	54
Time taken to build model:	0.01 sec	0.1 sec	0.05 sec	0.25 sec	0.1 sec	0.1 sec	0.1 sec	0.1 sec
Correctly Classified Instances	99.4%	100 %	99.3%	100%	99.4%	100%	99.3%	100%
Incorrectly Classified Instances	0.6 %	0 %	0.7%	0%	0.6%	0	0.6%	0
Kappa statistic	0.9912	1	0.9912	1	0.9912	1	0.9912	1
Mean absolute error	0.0062	0.0041	0.0682	0.0641	0.0062	0.0034	0.0062	0.0034
Root mean squared error	0.0571	0.0151	0.1067	0.09	0.0571	0.0134	0.0571	0.0134
Relative absolute error	1.7452%	1.1588%	19.193%	17.8575%	1.7452%	0.9502%	1.7452%	0.9502%
Root relative squared error	13.5421	3.5982%	25.3095	21.0288%	1.5421%	3.13%	1.5421%	3.13%
TP Rate (Weight Average)	0.994	1	0.994	1	0.994	1	0.994	1
FP rate (Weight Average)	0.001	0	0.001	0	0.001	0	0.001	0
Precision	0.994	1	0.994	1	0.994	1	0.994	1
Recall (Weight Average)	0.994	1	0.994	1	0.994	1	0.994	1
F-Measure (Weight Average)	0.994	1	0.994	1	0.994	1	0.994	1
ROC Area (Weight Average)	0.995	1	0.998	1	0.995	1	0.995	1

From the performance metrics, the Pruned Decision Tree and the JRip rules performed better than the other two algorithms in the layers. The duo have the same correctly classified instances of 99.4%, mean absolute error of 0.062, True positive (TP) rate and False positive (FP) rate of 0.994 and 0.001 respectively, ROC Area of 0.994 and recall weighted average of 0.994 respectively. This ascertains that both algorithms are suitable for the model. However, the pruned decision tree was chosen as the best algorithm in this study because it has a lesser time of 0.01 seconds to build the model compared to JRip with 0.1 seconds. Additionally, pruned decision tree algorithms generally has this ability to produce a simple tree structure with high accuracy in term of classification rate [16]. Pruning methods have been introduced to reduce the complexity of tree structure without any decrease in classification accuracy. The standard metric details of the decision tree, its tree structure and rules classification as generated by WEKA are presented in Figure 4 and Figure 5 respectively.

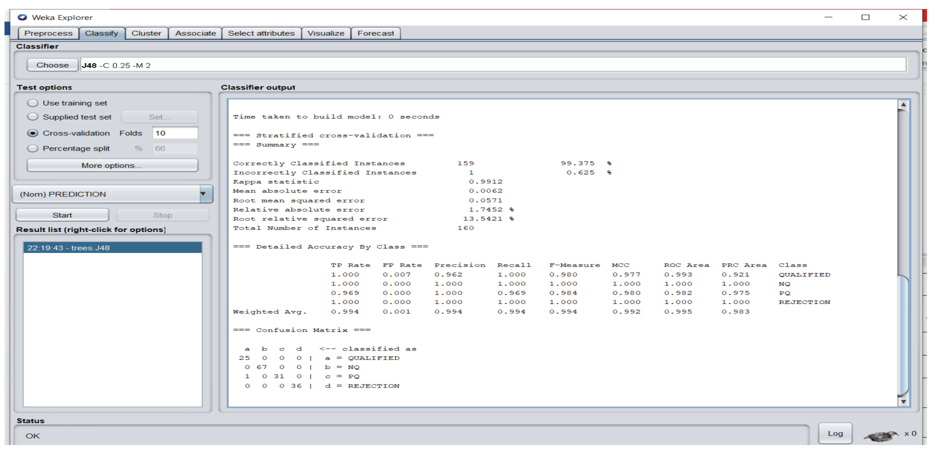

Figure 4: Standard Performance Metrics of Pruned Decision Tree

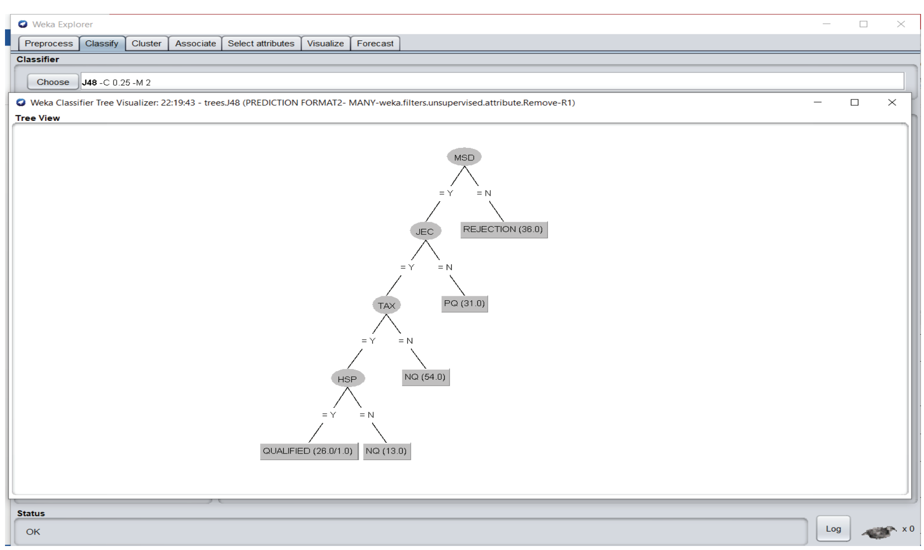

Figure 5: Pruned Decision Tree Structure

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3.5 Rules Generation and Mathematical Model

Few of the rules generated from the best algorithm (pruned decision tree) are stated as follows:

Rule 1: IF MSD = Y and JEC = Y and TAX = Y and HSP = Y THEN
Recommendation = QUALIFIED

Rule 2: IF MSD = N and JEC = Y and HSP = N and TAX = N THEN
Recommendation = REJECTION

Rule 3: IF MSD = Y and JEC = Y and TAX = Y and HSP = Y THEN
Recommendation = PQ (MAY BE CONSIDERED)

Rule 4: IF MSD = Y and JEC = N and TAX = N and HSP = Y THEN
Recommendation = NOT QUALIFIED

Rule 5: IF MSD = Y and JEC = N and TAX = Y and HSP = N THEN
Recommendation = NOT QUALIFIED

Rule 6: IF MSD = N and JEC = Y and TAX = Y and HSP = Y THEN
Recommendation = NOT QUALIFIED

The whole rules cannot be exhausted here, a back-end for updating the rules as the situation arises will be incorporated into the system to match other conditions.

3.6 Architecture of the Bid Responsive Evaluation Model (BREM)

Architecture of the Bid Responsiveness Evaluation Model (BREM): The architecture as shown in figure 6 is composed of six (6) major components: namely the bids criteria databank, consisting of the (mandatory criteria and weighted sub-factors criteria) components, the mandatory criteria measure whether the bid is responsive, while the weighted sub-factors measure whether the bidder is responsible. The second component is the data preprocessing, which involves data filtering and cleaning to remove noisy data and make it formatable for modeling. The third component is the data modeling, built using WEKA platform, the fourth component is the model output, which is the pattern that is generated from the experiment, and will be subjected to the fifth component which is the evaluation and selection mechanism component for final recommendations output.

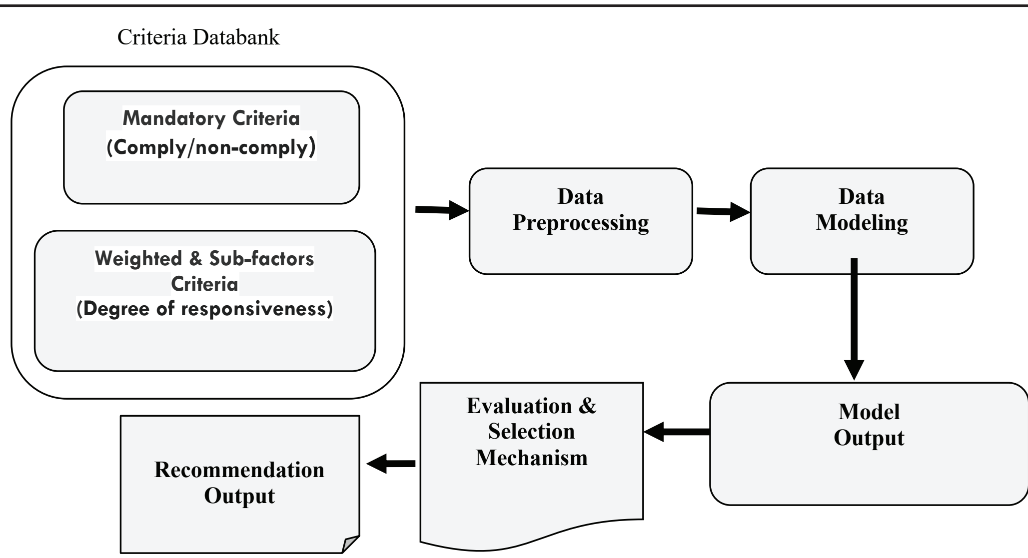

Figure 6: Architecture of Bid Responsiveness Evaluation Model (BREM)

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Process flow of the model: Firstly, the mandatory criteria determines the bids that meet with the submittal deadline, coupled with the determination of the bids that meets the bid specification. Secondly, the conditions above are tested to determine whether the lowest bid cost is also responsive. If considered substantially conformed to the bids specifications, it goes for the next stage, and if not, such bid is rejected and the next lowest proposed cost bids are tested. The next stage then determine whether the lowest bidder is responsible or not considering the quality, past performance and time specified for performance in the bidder's proposal. Bidder's skill, financial capability, ability and integrity are determined. The final stage determine if the lowest bid is responsive and lowest bidder is responsible. If the two conditions are met, the contract is awarded to the contractor that qualifies

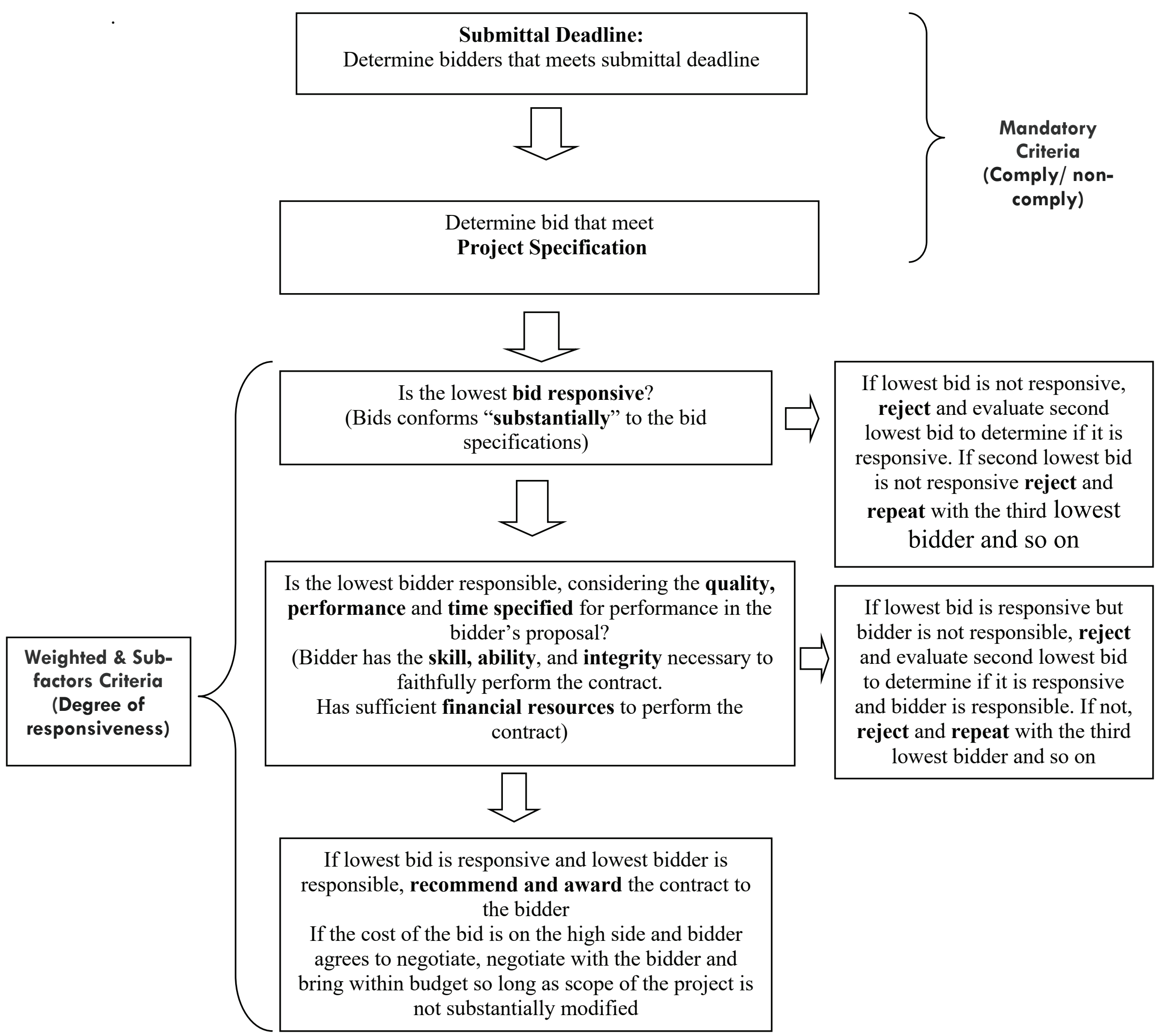

Figure 7 depicts the process flow of the Evaluation Model

Conclusion

The quest for an optimized evaluation method to overcome the challenges of the customary practice of bid evaluation in the public procurement and construction projects motivated this research. The research was focused at developing an optimized model for evaluation based on bids responsiveness strategy. To achieve the objectives of the research work, the researcher established a theoretical foundation for the research work through a considerable review of literature and consultations to find out what was already done in the field. A research instrument was developed using quantitative and qualitative techniques to collect respondents perceptive and evaluate the responses as regards their markup choice between bid responsiveness and lowest bid system. The study adopted purposive sampling technique and the targeted population comprises of contractors, consultants, clients and other civil engineer professionals. Various criteria outlined in bidding documents of construction projects and factors affecting the success of bids in construction projects were identified and assessed. Fourteen (14) identified factors affecting bid responsiveness in construction project were presented and ranked. Ability to comply with the bids specification criteria, financial capabilities, good history of satisfactory past performance as well as overall good reputation, are considered the key factors affecting bid responsiveness in construction projects. The model presented was tested and met its objectives. The model showed to be an improvement over the classical methodologies. When fully implemented, it will suitably improve the efficiency in the bid system and quality delivery in general construction projects. Therefore, the model is highly recommended for efficient bid evaluation in general procurement and construction projects.

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