

Original Research Paper

**CRITICAL FACTORS FOR SUPPLIERS' ASSESSMENT AND SELECTION:
EMPIRICAL EVIDENCE FROM PUBLIC INSTITUTIONS IN A DEVELOPING
COUNTRY**

Abstract

This examined the critical factors that influence the selection of suppliers in public institutions in Ghana. The study employed both descriptive and survey research design. The study was conducted between April, 2015 and March, 2017. Public institutions in the Brong Ahafo and Ashanti regions of Ghana constituted the population of the study. The study made use of purposive sampling technique to select 100 public institutions. Self-administered questionnaire was used to collect data from the respondents. Descriptive statistical analysis method was used to analyze the quantitative data. The analyses was done in percentages and mean and presented in relevant tables. The study found that the traditional suppliers' performance measurement approach, based on lowest cost was widely used to measure the performance of suppliers in public institutions in Ghana. Additionally, majority of the institutions applied categorical system and analytical hierarchical process of performance assessment alongside the cost based system. With regards to the specific criteria applied to assess the performance of suppliers, it was revealed that the quality or technical capabilities (e.g. durability, reliability, fitness for purpose and less variance of the products) of the suppliers was a major factor considered. Apart from quality criteria, cost criteria (price level, price stability and discounts and terms of payments offered by the suppliers) and delivery ability of the suppliers were also used to assess the performance of suppliers. It is

recommended that the management of the institutions should provide modern performance management tools to enable effective assessment of suppliers' performance.

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Key Words: Public Procurement, Suppliers' Performance, Cost Criteria, Quality Criteria, Delivery Criteria, Public Institutions

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1.0 INTRODUCTION

The need to increase the effectiveness, efficiency and transparency of Ghana's public procurement system, is of concern to the Government of Ghana (GoG). According to [1], public procurement can be susceptible to abuse, which can lead to leakage of public funds during the procurement process, and investments that are of substandard quality and often lacking the proper quantity. [1] indicated that procurement activities in the public sector represents for a substantial percentage of the total request for supplies and is progressively observed as an alternative and viable tool for advancing the aims of novelty strategies.

In light of the increasing complexity of the procurement system, the participation of suppliers, consultants and contractors has become influential in the pursuit for attaining sustainability compliance along the procurement system. [2] explained that procurement improves productivity and competitiveness, among other benefits. However, the authors argued that to realise the gains stated above, it is necessary to choose and keep suppliers who are able and capable. Nonetheless, a lot of issues influences the ability of an organization to select the appropriate supplier. In this regard, [3] assert that there is a need to assess the performance of the suppliers to help set appropriate supplier selection criteria. The authors proceeded that, commitment, trust, adequate finance, reliable delivery times, communication, technology, and cost or price have been noted as the commonly used criteria.

48 [4] noted that a vital concern in procurement administration is the assessment of suppliers'
 49 performance. [5] defined performance assessment as assessing, evaluating and managing the
 50 supplier's ability to fulfill and if possible surpass, their promised commitments. Likewise,
 51 according to [6] and dealing with supplier's performance with the aim of decreasing costs,
 52 alleviating risk, and driving constant enhancements in value and operations.

53 [3] explained that collective and constant measurement can assists organizations and
 54 institutions focus resources, identify performance glitches, develop strategies for supply chain
 55 improvements, and determine the total cost of ownership of supply relationships, products,
 56 and entire supply chains. Similarly, [1] contend that monitoring the performance of suppliers
 57 is a crucial phase of procurement management, however, one which can simply be under-
 58 resourced and neglected. [2] also posit that when performance monitoring is undertaken post-
 59 contract, the purpose is two-fold: to make sure that the supplier meets the performance
 60 criteria and ascertain room for improvement.

61 As essential concern in evaluating the performance of suppliers is determining who is best
 62 suited to evaluate that performance [7]. The authors maintain that the performance of
 63 suppliers must be evaluated impartially against standards that are determined in advance,
 64 understood plainly and settled by both parties. [1] are also of the opinion that sound
 65 performance assessment techniques must be applied. The authors explained that issues such
 66 as: conflict amongst criteria; multiple criteria (both quantitative and qualitative); involvement
 67 of many alternatives because of competition; internal and external limits forced on
 68 purchasing process makes supplier selection decision process very complicated. Nonetheless,
 69 [3] contend that it takes a great deal of energy and tolerance to develop an agreed criteria for
 70 suppliers' performance measurement. Whilst it is important to assess the performance of
 71 suppliers among suppliers in public institutions, the criteria to use to measure the suppliers

72 performance is the most important thing. The use of wrong methods and criteria will result to
 73 wrong evaluation. It is therefore important to ascertain the various methods and criteria that
 74 are employed to select and measure the performance of suppliers in the public sector. Sadly,
 75 literature on performance measurement of suppliers in the public sector in Ghana is non-
 76 existing. This study thus aims to fill the yawning gap by providing evidence on the critical
 77 factors that influence the selection of suppliers in the public sector in Ghana. Specifically, the
 78 study evaluates the various methods and criteria employed to measure the performance of
 79 public sector institutions in Ghana.

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81 **2.0 LITERATURE REVIEW**

82 **2.1 The concept of Public Procurement**

83 The public procurement activities has mirrored pressures between public anticipations of
 84 great standards of governance, overt (and covert) political impact and forces from wider
 85 interest of stakeholders. Similarly, [1] opined that public procurement practices at one end are
 86 extremely narrow and controlled structures, while some are characterized by utmost complete
 87 deregulation and decentralized duties where procurement is just another element of
 88 mainstream management. Public procurement is defined by [4] as the process by which
 89 institutions and organizations buy goods and services from other organizations, usually
 90 companies or enterprises. The authors assert that procurement occurs at both national and
 91 regional level and usually the procurement process is subjugated to specific rules and policies
 92 involving how the pertinent decisions are taken. Similarly, [3] argue that procurement is the
 93 process of obtaining goods and services in any way, like leasing, borrowing and even force or
 94 booty.

95 [8] contend that the effectiveness of procurement in Ghana is a major function of any
 96 organization. The authors maintained that the capacity and scope of procurement differ from

institution to institution, nonetheless, the philosophies, principles and processes are essentially similar. In view of this, [1] opines that the different definition and concepts given by diverse individuals and organizations about procurement reveal fairly dissimilar observations of what public procurement is for various organizations and stakeholders. This also submits that reconciliation between these opposing forces is not simply difficult but unsure because it represents more than conflicting expectations about what procurement is all about.

From the above, an attempt must therefore be made to define or at least attempt to explain the word procurement in public context. [4] defined public procurement as the process by which government departments or agencies purchase goods and services from the private sector. The authors maintained that it takes place at both national and regional levels. [1] also defined procurement as the process of obtaining goods and services in any way, including borrowing, leasing and even force or pillage. From the layman point of view, procuring can be seen as the act of acquiring or obtaining something; hence it is a general activity of mankind. From the definitions provided above, procurement can be defined simply as the procedure through which works, goods, services and consultancies are acquired by putting in the essential energy. In relation to public procurement, procurement involves the course of purchasing supplies or equipment for a government unit or agency or a corporation or the process of earning something particularly with effort or difficulty. It is clear from the above discussion that public procurement plays an important role in the acquisition and distribution of goods, works, and services to end user institutions, organization, groups, and individuals. This process is however noted to be the life wire of every institution, either public or private.

2.2 The Concept of Supplier Performance Management

Supplier management is defined by [9] as the part of procurement concerned with streamlining the supplier base and selecting, coordinating, appraising the of suppliers and building long term collaborative relationships. As demonstrated in the above definition, monitoring and measuring supplier performance is just one of the many activities involved in supplier performance management. Endorsement this point of view, [10] however regard evaluation, measurement and analysis of suppliers' performance as an important part of supplier performance management. [11] assert that the main aim of the supplier performance assessment is to lessen the risk related to purchase and maximize the overall value of the purchaser. Supplier performance assessment usually involves assessing, at a minimum, supplier quality, cost competitiveness, potential delivery performance and technological capability. [1] also explained that some of the other criteria used in the introductory appraisal of suppliers include financial risk analysis, evaluation of previous performance, and evaluation of supplier provided information.

According to [7], the supplier performance measurement is an important process. The supplier performance measurement is a continuous process which is distinct from the supplier evaluation and selection. The author further argued that effective methods and systems are required in order to record, evaluate and develop supplier performance. In relation to this, [6] contents that determining on what to measure and how to weigh each measurement criterion is a critical part in designing supplier measurement system. The authors further opine that there are two approaches to supplier evaluation: quantitative and qualitative. [4] also provide that price, quality and delivery are the traditional quantitative variables. [6] observed that delivery, quality and cost reduction are the main categories for quantitative variables.

2.3 Supplier Measurement Techniques and Assessment Methods

According to [9], a supplier selection is a multi-objective problem concerning quantitative and qualitative criteria. [6] assert that three suppliers measurement methods exists: weighted-pointed system, categorical system and cost-based system. Apart from the three methods identified by [6], two additional methods were also put forward by [12], which includes, analytic hierarchical process (AHP) and mathematical programming model or artificial neural network (ANN).

Weighted-Pointed Method of Linear Average Method: According to [13], weighted-pointed method is a method that evaluates and calculates scores in all criteria. Weighted average method is more dependable and permits reliable ranking of suppliers. Additionally, [9] argues that quantitative and qualitative criteria can be put together in this system. The authors further indicated that to use the system, the key performance indicators for supplier performance assessment must be cautiously chosen. In addition, individuals involved in this process have to decide on the weight of each performance category. The firm decides a weight allocating to prevent or minimize subjectivity. The weight for the individual performance group is then multiplied by the performance score that is allocated to it. Finally, these scores are aggregated to ascertain a final rating for each supplier.

161 **Categorical System:** [13] identified the categorical system as the most subjective and, thus,
 162 the least reliable. Additionally, the categorical system is a low-cost system and easier to
 163 implement. Because of the above attributes of the categorical system, it is widely used by
 164 small firms and the firms which are in the process of developing an evaluation system. As has
 165 been identified, the categorical supplier measurement method is the easiest method to use,
 166 however, [4] noted that it suffers from subjectivity. This is because it fails to provide compr
 167 ehensive insight into the suppliers' true performance because the attributes being measured ar
 168 e weighted equally.

169 **Cost-Based Method:** The cost-based method is argued to be the most advanced and least
 170 subjective [13]. The cost-base method is applied by calculating the additional cost (the costs
 171 for each non-performance) every time supplier does not perform as expected. This is however
 172 argued to be the main challenge associated with the use of the cost-based system. Likewise,
 173 [12] opines that the cost-based method is a methodology, which looks further than price to
 174 embrace several other purchase-related costs.

175 The cost-based method is very objective because it calculate the total cost of doing business
 176 by considering non-performance costs [6]. According to the authors, the main difficulty
 177 associated with the used of the cost-based method are its complexity and its requirement that
 178 users have a developed cost accounting system. , [4] also observed that even though this
 179 sounds like an ideal way of handling cost, it is difficult to detect the costs of suppliers' non-p
 180 erformance.

Analytical Hierarchical Process (AHP): According to [13], the analytical hierarchical process (AHP) is a decision-making method established for prioritizing alternatives when multiple criteria must be considered and permits the decision maker to structure complex problems in the form of a hierarchy, or a set of integrated levels. [14] employed the analytical hierarch process (AHP) approach for critical factors for effective supplier selection.

Mathematics Programming Models or Artificial Neural Network (ANN): [15] argued that the mathematics programming model or artificial neural network is often considered as, more quantitative criteria. According to [12], the ANN model is economical and saves time. The deficiency of this model is that it requires specific software and demands competent personnel who are expert on this subject.

2.4 Critical Factors Affecting the Selection of Suppliers

[3] explained that the selection of a supplier is normally a time wasting procedure that assess suppliers on numerous standards or criteria. These criteria includes the production cost, cost of raw materials, quality assessment, quality staff, delivery system, personal facilities etc. [11] has showed that fundamental to the established selection criteria of suppliers is the necessity to evaluate the quality and service abilities of a supplier together with plans and managerial orientation with the purchaser. The authors further opine that the selection of suppliers is a complex process because several criteria must be taken into consideration during the process of decision making.

As a recommendation, [7] opine that a data/information bank having the list of approved suppliers, with their profiles in crucial in the supplier selection process. According to the authors, essential information have to include technical capability, quality assessment and organization profile. A supplier selection criterion was introduced by [3] which has since

gained a lot of fame. [12] model consists of: cost criteria, technical capability criteria, quality criteria, organizational profile criteria, service criteria, supplier profile criteria and response to customers:

Cost Criteria: [3] assert that the primary objective of the cost benchmark is to identify significant component of cost linked to purchase. The authors explained that the most popular cost element connected to a product is purchase price, transportation cost and taxes. Similarly, operational costs are also taken into consideration during the process of selecting a supplier. The operational cost comprises of transaction processing; cost of rejects etc. but it requires more efforts to estimate.

Technical Capability: It has been argued that component technical ability is needed by suppliers to offer quality product or service, guarantee future enhancement in performance and stimulate fruitful development efforts. The technical capabilities of a supplier are particularly very important when the strategy of a firm include the development of a new product or technology or right to use to proprietary technology. [16] also observe that the technical capabilities factor has been measured on the basis of the significance of the following technical dimensions: compliance with quantity, compliance with packaging standard, compliance with due date and plant layout and material.

Quality Assessment: According to [10], quality assessment is a crucial factor of suppliers by which they can increase and maintain quality and delivery performance. [17] asserts that the quality of a product or a service has been measured on the basis of the important of the following quality dimensions: management commitment, process improvement of suppliers, product development of suppliers, quality assessment in production, quality planning and quality staff of suppliers. The quality of a product or a service is a very critical criteria because it affects the rejection rate of a product or a service.

229 **Organizational Profile:** [10] opine that the profile of an institution are evaluated on the basis
 230 of the significance of the following measurements: financial performance, attainment of sales
 231 and marketing goals, accomplishment of current organizational goals and strategy for
 232 technology age. It is therefore imperative to note that good suppliers have to have high
 233 organizational power and advanced coordination skills.

234 **Service Delivery Levels:** The suppliers' performance in the provision of service to its clients
 235 is the leading criteria used to decide its appropriateness for a specific product [6]. According
 236 to the author, the service level of the supplier is analysed based on delivery and lead time. Th
 237 e delivery factors means the capacity of the supplier to observe the determined supply tim
 238 etable is always the main criterion for the selection of a supplier in this fast moving world
 239 [17]. This suggests that suppliers who are able to keep their promises are easier and profitable
 240 to work with. The time is the time between order and delivery of material and the actual deliv
 241 ery.

242 **Supplier's Profile:** The profile of a supplier consists of their performance and past history.
 243 The performance and past history of the suppliers assist to take decisions regarding the
 244 selection of a supplier. [17] provides that the components of a suppliers profile consists of the
 245 financial status and responses of customers. According to [18], the financial status of the
 246 supplier can be evaluated by gathering the information about the annual turnover of suppliers
 247 and their financial structure based on the past history. The economic status of the suppliers'
 248 country has to be ascertained which includes: the effect of the currency exchange rate, local
 249 price control etc.

Response of Customers: One of the significant criteria used to assess the performance of suppliers is the reaction or response of the customers towards the supplier. [10] posit that suppliers that have a good customer base should be favoured more than others. Similarly, the authors argued that the performance history of the supplier must be evaluated prudently by noting the competitive nature of the supplier, response to market, its past production schedule, and its ability to make commercial relations and business references. [4] thus contends that old supplies are more experienced and more stable in business.

3.0 METHODOLOGY

The study employs a survey study approach. Survey is employed in most studies which aims directly at generalized understanding instead of a comprehensive understanding of a single, individual case [19]. [19] further argues that survey study is regularly used to assess practices, thoughts, opinions, and feelings. Many studies have highlighted the benefits of a survey method. First, [6] argues that surveys are an exceptional way to gather many data from wide variety of people. This makes surveys comparatively cost effective. Connected to the advantage of cost effectiveness of survey, is that survey has the prospects of generalizability. Descriptive research approach is also used to structure this study. [20] explain that descriptive research studies are designed to ascertain information, which relates to the current status of development. The descriptive research approach was chosen because variables are not manipulated by the researcher, instead, the study describes the phenomenon that existed at the time of the research.

Public institutions in the Brong Ahafo and Ashanti regions of Ghana constituted the population of the study. The various institutions considered for the study included: public tertiary institutions, hospitals, government assisted senior high schools, colleges of educations, municipal and district assemblies, nursing training colleges, ministries,

department and agencies. The procurement departments/units or accounts departments of one hundred (100) public institutions were chosen for the study. Two respondents were selected from each institution. As a result, a total of two hundred (200) respondents were chosen for the study. The study made use of purposive sampling technique to select the respondents. This is because, the procurement departments or where necessary, the accounts department dealt directly with the suppliers and thus they were assumed to be better placed to assess the performance of the suppliers. The respondents that were purposively selected were the head and staff of the procurement units of the public institutions.

Self-administered questionnaires were used to collect data from the respondents. Both closed-ended questions and open-ended questions were used to design the questionnaire. The questionnaires were mainly made up of Likert-scale questions. In this study, only five categories were used, for example: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). Certain principles were observed during the design of the questionnaires. The questions were concise, short, simple, straight forward and clear. Two hundred (200) questionnaires were distributed to the respondents at their various offices. The researchers allowed a period of two weeks to collect the questionnaires from the respondents.

Descriptive statistical analysis method was used to analyze the quantitative data. The various answers provided in the Likert scale questions were assigned numbers and were analyzed. The analyses was done in percentages and were also reduced to mean or average values. Data obtained were organized in relevant tables with the help of computer data analyses software such as the use of Statistical Package for Social Sciences (SPSS), version 21.

4.0 RESULTS AND DISCUSSION

4.1 Methods used to measure Suppliers Performance

This section presents the data on the methods used to measure the performance of suppliers in public institutions in Ghana. The data obtained on this subject matter is presented in Table 1. As shown in Table 1, almost all the respondents (93.5%) measured the performance of suppliers using the cost based method. The main idea of the cost-base method is to calculate the total cost of procuring goods or services from a supplier. The respondents indicated that the cost-based method is implemented by calculating the price of goods and services of the various suppliers. The movement and variation in the prices of the goods and services are also determined. Similarly, the cost based method is applied by calculating the additional costs (the costs for each non-performance) every time supplier does not perform as expected.

It was further ascertained that the cost-based method assesses the performance of supplier by using the tools of standard cost analysis. This implies that these institutions must institute a good system of costing and accurate records of each supplier to enable this method to be applied effectively. However, it was realized that good system of costing and accurate records on suppliers were not kept thus posing as a major challenge to the effective application of the cost based method. Nonetheless, it was realized that this is the widely used method to assess the performance of suppliers in public institutions in Ghana. The result of this study is consistent with the findings of [4] who found that the cost-based method is the most widely used method of assessing the performance of suppliers.

Table 1 further shows that 149 (74.5%) of the respondents also applied categorical system of performance assessment alongside the cost based system. It was realized that the categorical method is applied by categorizing the performance of each supplier in specific areas identified by a list of applicable performance assessment variables. This method involves a

process where the institutions maintains records of all suppliers and monitored, along with their actual performance by product. With this method, the institutions developed records of important performance factors for assessment purposes, and the institutions assigns a grade in simple categorical terms, such as very good, good, neutral and unsatisfactory, indicating the vendor's actual performance in each area.

From the study, it was ascertained that this method is one of the easiest in comparison to the other performance assessment methods. Furthermore, it was observed that the categorical system is a low-cost system and its implementation is easy. The findings corroborates the findings of [4] who observed that the categorical system, it is widely used by firms, especially the firms which are in the process of developing an evaluation system. As easy as it may appear, this method however might fail to effectively assess a supplier's performance because it fails to provide a comprehensive understanding into the true performance of supplier since the attributes assessed are weighted equally.

The result presented in Table 1 further shows that Analytical Hierarchical Process (AHP) was the next widely used method apart from the cost based and the categorical methods. As indicated in Table 1, almost half (48.5%) of the respondents also used Analytical Hierarchical Process to assess the performance of suppliers in public institutions in Ghana. The study found that the Analytical Hierarchical Process (AHP) is a decision-making technique put in place to prioritize alternatives when multiple criteria must be considered and allows the institutions to structure complex problems in the form of a hierarchy, or a set of integrated levels. This result is not at variance with similar studies like [14] who used the Analytical Hierarch Process (AHP) method for supplier selection and observed that supplier reliability, product quality and supplier experiences are the critical factors for effective supplier selection.

347 The study further revealed that 82 (41.5%) of the respondents used the Weighted-Point
 348 Method to measure the performance of suppliers in their institutions. The respondents that
 349 applied the weighted average method to assess the performance of suppliers indicated that the
 350 weighted pointed method adds the qualitative elements of the categorical system and
 351 quantifiable procedures of the cost-based system. From the respondents' perspective, many
 352 evaluation factors are identified and weights are then assigned to each factor. The relative
 353 importance of each factor are then expressed in numerical terms (weights) in such a way that
 354 a Hcomposite performance index can be calculated and supplier comparisons made.

355 The respondents further indicated that their institutions normally use the weighted point
 356 system because it is reliable and it has a lower cost of implementation. The respondents
 357 further indicated that the weighted point method was also flexible because they could alter
 358 the weights assigned to each performance category or vary the performance categories
 359 themselves depending on the strategic priorities of the organizations. It can be revealed that
 360 this method is not particularly popular among the respondents. This can be attributed to its
 361 long process and complex nature. Additionally, it can was observed that the weighted point
 362 method is subjective because the categories and weights can be assigned arbitrary based on
 363 one's intuition, experience and opinion. It therefore would make comparison across
 364 institutions difficult. Nonetheless, if it is applied effectively, it can be one of the best methods
 365 because of its quantitative and qualitative appeals.

366 Finally, none of the respondents (or institutions) applied the Mathematical Programming
 367 Model to measure the performance of suppliers in their institutions. Some of the respondents
 368 indicated that they were aware of this method, however it requires a complex process which
 369 requires analytical software and accurate data. The respondents further indicated that such
 370 software were not available and thus made its application not practicable. From the

discussions above, it can be realized that majority of the respondents used more than one method to assess the performance of suppliers. Some of the methods were used as complementary whilst the performance of some of the suppliers were measured with specific methods because of the type of data obtained from them by the institutions. It must be put forward that the availability of data determines the type of method to be used to assess the performance of a supplier. Some data might be suitable for a particular method whilst the same data might not be suitable for alternative methods.

Table 1: Methods used to measure Suppliers Performance

Supplier Performance Measurement	Frequency	Percentage (%)
Weighted-Point Method	82	41.0
Categorical System	149	74.5
Cost-Based Method	187	93.5
Analytical Hierarchical Process (AHP)	96	48.0
Mathematical Programming Models	0	0.0

4.2 Criteria used to measure the performance of Suppliers

The various criteria employed by the public institutions to measure the performance of suppliers are presented in this section. These criteria have been analyzed alongside four main categories: cost, delivery, quality or technical capability and organizational profile.

4.2.1 Cost Criteria

As shown in Table 2, majority of the respondents (69.5%) strongly agreed that price level was a criteria used to measure the performance of suppliers whilst 19.5% agreed. With a mean value of 1.54, it clearly indicates that majority of the respondents used price level as a criteria to measure the performance of suppliers. In addition, 54.5% of the procurement staff

strongly agreed that the stability of prices of goods and services from suppliers was used to measure the suppliers' performance whilst 27.5% agreed. On the other hand, only 11.5% of the respondents disagreed that price stability was a criteria used by the public institutions to measure the performance of suppliers. The mean rating of the respondents that indicated that the stability of price of goods from suppliers was used to measure the suppliers performance was 1.25, thus depicting that majority of the staff used the stability of price of goods from suppliers to measure the suppliers' performance.

The respondents were further asked to indicate whether they used the advance notice of price changes from suppliers to measure the performance of suppliers. As shown in Table 2, slightly more than one-third (36.0%) of the respondents agreed that they used advance notice from suppliers regarding price changes to measure the performance of suppliers. On the other hand, 27.5% of the respondents strongly agreed that advance notice from suppliers on price changes was one of the criteria used to measure the performance of suppliers whilst 23.5% disagreed and additional 4.0% strongly disagreed. A mean rating of 0.58 was ascertained for the respondents that indicated that they used advance notice from suppliers regarding price changes to measure the performance of suppliers. This clearly shows that majority of the respondents used the advance notice from suppliers regarding price changes to measure the performance of suppliers.

An additional 62.0% of the respondents strongly agreed that discount and payment terms offered by suppliers was used to assess their performance. Another 27.5% also agreed that discount and payment terms offered by suppliers was used to assess their performance. The mean rating of respondents that agreed that the discount and payment terms offered by suppliers was used to assess their performance was 1.45. This indicates that the respondents

412 used the discount and payment terms offered by suppliers was used to assess their
413 performance.

414 The discussion above indicate that the staff at the procurement units of the public institutions
415 in Ghana used various cost criteria to assess the performance of suppliers. The result shows
416 that price was the criteria mostly used to measure the performance of suppliers followed by
417 the stability of the prices of goods. The discounts and terms of payments offered by suppliers
418 was another criteria mostly used to measure suppliers' performance and then advance notice
419 of price changes followed. This finding confirms that of [3], [9] and [18] who reported that
420 pricing or cost criteria was one of the major criteria used to measure the performance of
421 suppliers. According to the author, the pricing criteria means that the prices should be
422 comparable to other suppliers of similar products. The price stability also means that the
423 prices should be stable over time. Similarly, the advanced notice of price changes means that
424 the supplier should inform their customers in advance about price changes.

425 **Table 2: Cost Criteria**

Cost Criteria	SA	A	NS	D	SD	Mean
Percentages						
Price level	69.5	19.5	6.0	5.0	0.0	1.54
Price stability	54.5	27.5	6.5	11.5	0.0	1.25
Advanced notice of price changes	27.5	36.0	8.0	23.5	5.0	0.58
Discounts and payment terms offered	62.0	27.5	4.0	6.5	0.0	1.45

426 **Key: Strongly Agree = 2; Agree = 1, Neutral = 0; Disagree = -1; Strongly Disagree = -2**

427

428 **4.2.2 Delivery Criteria**

429 Delivery was another criteria mostly used to measure the performance of suppliers. The
430 respondents were asked to indicate which of the criteria under delivery were used to measure

the performance of suppliers. As indicated in Table 3, almost half (45.5%) of the staff of the procurement units or accounts sections of the public institutions agreed that delivery time was used to measure the performance of suppliers whilst 44.0% strongly agreed. On the other hand, 4% of the respondents disagreed that delivery time was used to measure the performance of suppliers. The mean rating obtained for this criteria of suppliers' performance assessment was 1.28, which indicates that majority of the respondents used delivery time to measure the performance of suppliers.

It was further ascertained that 55.0% and 43.0% of the respondents strongly agreed and agreed respectively that quantity was used to measure the performance of suppliers. None of the respondents disagreed that quantity was used to measure the performance of suppliers. With this criteria, the mean rating was 1.53 which also shows a widespread acceptance of its usage among the respondents. Packaging was another delivery criterial used to measure the performance of suppliers in public institutions in Ghana. Table 3 shows that that 37.5% of the respondents agreed that that packaging was used to measure the performance of suppliers whilst 33.5% strongly agreed that packaging was used to measure the performance of suppliers. On the other hand, 18.0% and 3.0% disagreed and strongly disagreed respectively that packaging was used to measure the performance of suppliers. The packaging criteria to measure the performance of suppliers had a mean of 0.81. This indicates that majority of the respondents also measured the performance of suppliers by using the packaging of their products and services.

Table 3 also indicates that 44.0% of the respondents strongly agreed that the quick response of suppliers in case of emergency was used to measure the performance of suppliers and another 33.5% of the respondents also agreed that the quick response of suppliers in case of emergency was used to measure the performance of suppliers. On the other hand, 14.5%

disagreed that the quick response of suppliers in case of emergency was used to measure the performance of suppliers whilst 1.0% strongly disagreed. This criteria also obtained a mean rating of 1.05, thus suggesting that it is widely used among staff as a suppliers' performance measurement criteria.

Further, 24.5% of the staff strongly agreed that the communication systems or skills (phone, fax, e-mail and internet) was used to measure the performance of suppliers. Another 43.0% of the respondents also agreed that the communication systems and skills of the suppliers was used to measure the performance of suppliers. On the other hand, 18.5% of the staff disagreed that whilst 3.5% strongly disagreed that communication systems and skills of the suppliers was used to measure the performance of suppliers. The mean rating of 0.67 obtained for this criteria suggests that majority of the staff used this criteria to measure the performance of suppliers.

Table 3 further shows 38.5% of the respondents strongly agreed that the willingness of the suppliers to change products to meet their changing needs was also used measure the performance of suppliers. Similarly, another 41.0% of the staff agreed that the willingness of the suppliers to change products/services to meet their changing needs was also used measure the performance of suppliers. On the other hand, 9.5% of the respondents disagreed that the willingness of the suppliers to change products to meet their changing needs was also used measure the performance of suppliers. With a mean rating of 1.07, it clearly indicates the consensus among the respondents that the willingness of the suppliers to change products to meet their changing needs was also used measure their performance.

It can be observed that the result obtained under the delivery criteria are in consonance with the results of other studies. For instance, Weele (2010) noted that: quality level, service level, correct quantity, on-time delivery, price/cost of product, use of electronic data interchange

(EDI) and willingness to share sensitive information are some of the supplier measurement criteria that can be considered. eNotes Community (2013) also confirms this by indicating that presence of certification or other documentation, flexibility to respond to unexpected demand changes, communication skills/systems (phone, fax, e-mail, Internet), quick response time in case of emergency, problem, or special request, willingness to change their products and services to meet your changing needs and willingness to participate in your firm's new product development and value analysis are other performance measurement criteria of suppliers under the delivery criteria.

Table 3: Delivery Criteria

Delivery Criteria	SA	A	NS	D	SD	Mean
Percentages						
Time	44.0	45.5	5.5	4.0	1.0	1.28
Quantity	55.0	43.0	2.0	0.0	0.0	1.53
Packaging	33.5	37.5	8.0	18.0	3.0	0.81
Documentation	25.0	31.0	10.5	28.5	5.0	0.43
Presence of certification	27.5	23.0	19.5	23.5	6.5	0.42
Quick response time in case of emergency	44.0	33.5	7.0	14.5	1.0	1.05
Communication skills/systems (phone, fax, e-mail)	24.5	43.0	10.5	18.5	3.5	0.67
Response to unexpected demand changes	28.5	39.0	16.5	15.0	1.0	0.79
Willingness to change products to meet changing needs	38.5	41.0	10.0	9.5	1.0	1.07
Key: Strongly Agree = 2; Agree = 1, Neutral = 0; Disagree = -1; Strongly Disagree = -2						

4.2.3 Quality or Technical Capability Criteria

The respondents were further asked to indicate the various criteria used to assess the quality or technical capabilities of suppliers in the public institutions in Ghana. The various criteria identified were reliability, durability, fitness for purpose, less variance, meeting requirements and less defective of the goods and services. As shown in Table 4, the respondents that

494 strongly agreed that reliability was a major criteria used to assess the performance of
 495 suppliers was 73.5% and another 23.0% also agreed. With a mean rating of 1.70, it clearly
 496 shows that the reliability of suppliers was a major criteria used to measure the performance of
 497 suppliers.

498 It was further realized that the durability of the products was another criteria that was
 499 employed to measure suppliers' performance. Table 4 further shows that 70% and 27.5% of
 500 the respondents strongly agreed and agreed respectively that the durability of the products
 501 was another criteria that was employed to measure suppliers' performance. The mean rating
 502 for this criteria was 1.68, which clearly shows that the respondents widely used the durability
 503 of the products was another criteria that was employed to measure suppliers' performance.
 504 With regards to the 'fitness for purpose' criteria, 57.5% of the respondents strongly agreed to
 505 its usage whilst 36.0% also agreed that fitness for purpose was a major criteria used to
 506 measure the performance of suppliers in public institutions in Ghana. This criteria also
 507 obtained a mean rating of 1.63. This also shows that majority of the respondents contended
 508 that fitness for purpose was another criteria used to assess the performance of suppliers.

509 The variance of the goods and services was also ascertained to be one of the criteria used to
 510 assess the technical capability and quality of the goods and services of suppliers. As shown in
 511 Table 3, majority (mean = 1.63) of the respondents agreed that the rate of variance of the
 512 goods and services provided by suppliers was also used to assess the performance of
 513 suppliers. Another 71.5% (mean = 1.67) also strongly agreed that the rate at which suppliers
 514 meet the requirements of the goods and services was also used to measure the performance of
 515 suppliers.

516 Finally, the rate of defectiveness of the goods was also another criteria that was used to
 517 measure the performance of suppliers. Table 4 shows that majority (62.0%) of the

respondents strongly agreed that the defectiveness of the goods was also another criteria that was used to measure the performance of suppliers. Again, 30.5% of the respondents agreed that the defectiveness of the goods and services was also another criteria that was used to measure the performance of suppliers whilst 5.0% disagreed that the defectiveness of the goods and services was also another criteria that was used to measure the performance of suppliers. This criteria obtained a mean rating of 1.50, which shows that the respondents used the level of defectiveness of products to measure the performance of suppliers in the public sector in Ghana.

Table 4: Quality or Technical Capability Criteria

Quality or Technical Capability Criteria	SA	A	NS	D	SD	Mean
Percentages						
Reliability	73.5	23.0	3.5	0.0	0.0	1.70
Durability	70.0	27.5	2.5	0.0	0.0	1.68
Fitness for purpose	57.5	36.0	2.0	4.5	0.0	1.47
Less variance	68.5	26.0	5.5	0.0	0.0	1.63
Meeting requirements	71.5	24.0	4.5	0.0	0.0	1.67
Less defective	62.0	30.5	2.5	5.0	0.0	1.50

Key: Strongly Agree = 2; Agree = 1, Neutral = 0; Disagree = -1; Strongly Disagree = -2

4.2.4 Organizational Profile Criteria

Finally, the organizational profile was the least criteria that was used to assess the performance of suppliers in the public institutions in the Brong Ahafo region of Ghana. As shown in Table 5, financial performance of the companies was not widely used by the respondents. Almost half (mean = 0.32) of the respondents used financial performance of the companies to measure the performance of suppliers. A further 12.5% and 37.0% of the

respondents strongly agreed and agreed respectively that the customer base of the companies was used to measure the performance of suppliers. On the other hand, 23.0% and 10.5% of the respondents disagreed and strongly disagreed respectively that the customer base of the companies was used to measure the performance of suppliers.

The service level (mean rating = 0.60) of the respondents was also used to assess the performance of the suppliers of goods in public institutions. The profile of suppliers (mean = -0.27), ease of communication (mean = -0.25) and the ages of the firms (mean = -0.33) were however not used to measure the performance of suppliers in the public institutions in Ghana. On the other hand, the rate at which the suppliers used technology in their operation (mean = 0.54)) was also used to measure the performance of suppliers.

Table 5: Organizational Profile Criteria

Organizational Profile Criteria	SA	A	NS	D	SD	Mean
Percentages						
Financial Performance	14.0	39.5	18.5	20.0	8.0	0.32
Customer base	12.5	37.0	17.0	23.0	10.5	0.18
Service Levels	22.	44.0	7.5	24.5	2.0	0.60
Supplier's Profile	11.0	22.0	6.0	51.5	9.5	-0.27
Ease of Communication	9.0	25.5	6.5	50.0	9.0	-0.25
Age of firm	13.5	16.0	10.5	44.0	16.0	-0.33
Use of technology	21.0	46.5	5.5	19.5	7.5	0.54

Key: Strongly Agree = 2; Agree = 1, Neutral = 0; Disagree = -1; Strongly Disagree = -2

5.0 CONCLUSION

The study employed a self-administered questionnaire to assess the various critical factors that influence the selection of suppliers in public institutions and found that the traditional suppliers' performance measurement approach based on lowest cost was widely used to

measure the performance of suppliers in public institutions in Ghana. Additionally, majority of the institutions applied categorical system of performance assessment alongside the cost based system. Again, almost half of the institutions also used Analytical Hierarchical Process to assess the performance of suppliers in public institutions in the Brong Ahafo region of Ghana. However, a small number of the staff used the Weighted-Point Method to measure the performance of suppliers in their institutions.

With regards to the specific criteria applied to assess the performance of suppliers, it was revealed that the quality or technical capabilities of the suppliers was a major factor considered. Specifically, the durability, reliability, fitness for purpose and less variance of the products were the criteria that influenced the choice of a supplier. Apart from quality criteria, cost of products was also used to assess the performance of suppliers. With regards to the cost criteria, the factors considered were price level, price stability and discounts and terms of payments offered by the suppliers. The delivery ability of the suppliers was also another criteria used to select suppliers. The specific criteria considered here were delivery time, quantity, packaging, response to emergency and willingness of suppliers to change products to meet changing needs.

The public institutions in addition hardly used the organizational profile of suppliers' to assess the performance of suppliers. However, the financial performance, customer base and the use of technology by suppliers were sparsely used by the public institutions to assess the performance of suppliers. It is recommended that the management of these institutions should provide modern performance management tools to enable effective assessment of suppliers' performance in these institutions.

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