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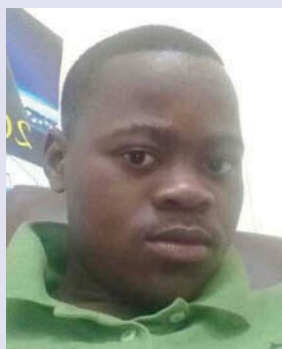
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PRODUCTION & MANUFACTURING | RESEARCH ARTICLE

The role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector in Zimbabwe

Tinotenda Fredrick Munyimi*

Abstract: This research is on the role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector. The researcher has reviewed both practitioners and academic literature. This research method was a cross-industry survey of construction companies. The population of this research was made up of the staff members of the procurement management departments of the companies in the construction sector. This research used purposive sampling to select construction companies. A sample of 56 procurement practitioners out of the total population of 65 procurement employees in the construction sector was selected randomly. Primary data were collected in a comprehensive survey closed-ended questionnaire from procurement practitioners working in the construction sector and supported by an open-ended interview with procurement managers only. The researcher calculated descriptive and inferential statistics using the Statistical Package for Social Science software (Version 22), where quantitative findings were tabularized. The hypothesis was tested utilising the one-way analysis



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Tinotenda Fredrick Munyimi has over two years of public, private and third sectors procurement experience acquired during his employment with Zimbabwe Electricity Supply Authority (ZESA) – Powertel Communications, Harare, Zimbabwe with various capacities before he joined Bindura Municipality, Bindura, Zimbabwe as a procurer in January 2019. He has expertise in public procurement, private sector procurement and non-governmental organisations procurement. Tinotenda Fredrick Munyimi is a qualified procurer by profession. He holds a Bachelor of Commerce Honours Degree in Purchasing and Supply Management from Bindura University of Science, Bindura, Zimbabwe in October 2018. He is also studying to qualify as a chartered procurer with Chartered Institute of Procurement and Supply, United Kingdom. His professional interests are in the areas of public sector procurement, private sector procurement, third sector procurement, sustainable procurement, strategic procurement, global procurement, legal aspects in procurement, negotiation skills in procurement and buyer-supplier relationships.

PUBLIC INTEREST STATEMENT

This research is useful for procurement practitioners and policy-makers (Procurement Regulatory Authority of Zimbabwe) who want to curb wrong deliveries of construction materials. This research suggests that construction companies must focus on using performance specifications for construction materials with specific purpose, function or application, brand or trade name specifications for construction materials that rely on brand names known for their proven quality and sample specifications on construction materials with complex specifications. This research contributes to the literature in procurement specifications, which is scarce in most developing countries. Moreover, practicing procurement directors, procurement managers, procurement officers, buyers and procurement clerks, particularly those in the construction sector will draw some lessons from this research in dealing with wrong deliveries related issues. The other vital issue is that findings can also be repurposed to assist policymakers in endorsing policies and progress existing ones to assist companies faced with deliveries of wrong materials.

of variance (ANOVA) and multiple linear regression analysis. This research reveals that there is a positive significant correlation of the three types of procurement specifications in curbing wrong deliveries of construction materials, namely, performance specifications, brand or trade name specifications and sample specifications. The results of this research imply that practicing procurement directors, procurement managers, procurement officers, buyers and procurement assistants should use performance specifications for construction materials with specific purpose, function or application, brand or trade name specifications for construction materials that rely on brand names known for their proven quality and sample specifications on construction materials with complex specifications to curb wrong deliveries of construction materials in the construction sector. This research provides reliable baseline data for future research into would these procurement specifications help curtail construction projects risk and would they provide support should there be any legal disputes between the procurer and the supplier.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: procurement specifications; wrong deliveries; materials; construction

1. Introduction

Currently, with the advent of global and very competitive markets, practicing procurement directors and procurement managers are paying serious attention to providing valuable materials and products to their internal user departments and customers with the most economically advantageous tender to specification. The role of specifications in the procurement process is documented as significant (Chartered Institute of Purchasing & Supply, 2017).

In the specification document, the description of the preferred solution is defined by a set of requests. A strong description of the wanted clarification is vital since it will upturn the prospect to achieve an efficacious requirement. In order to ensure a pure description, the number of requirement statements must be enough to guide engineers to achieve the aim of the product (Bailey, Farmer, Crocker, Jessop & Jones, 2017).

Several product development approaches describe product development as a well-structured, serial movement, starting with a requirements specification. Hence, creating a requirement specification is vital and must be a central issue in procurement (Munyimi & Chari, 2018). Hugo and Badenhorst-Weiss (2017) acknowledge the benefit of having a comprehensive specification at the start of the procurement process. Furthermore, these theoretical literatures provide some guidelines for the preparation of a good specification, for instance, procurement requirements should be unambiguous, solution-independent formulation, clearly linked to internal user and customer needs, measurable (qualitative or quantitative).

Change in procurement requirements during the procurement is crucial for improvement or error modification but from an alternative point of opinion it might cause costs to both times to market delay, delay in construction projects and cost increase. Nevertheless, both costs rely upon the gap among the initial specification, which is developed before the procurement process starts to the full specification, and the specification when the procurement process is completed (Waters, 2017).

Wrong deliveries of construction materials are one of the major glitches frequently experienced on construction project places and they are costly to both procurers and suppliers. Wrong deliveries of construction materials can initiate negative effects such as bigger costs, loss of

productivity and revenue through several lawsuits between owners and contractors, leading to contract termination (Mohammed & Isah, 2012). The construction sector is faced with a lot of problems, among which is wrong deliveries of construction materials in project execution (Construction Industry Federation of Zimbabwe, 2018).

It has been researched, that wrong deliveries of construction materials is a major setback in the construction sector. The problem of wrong deliveries in the construction sector is a global phenomenon. It was observed that the performance of the construction sector in terms of time was poor (Construction Industry Federation of Zimbabwe, 2018). Therefore, wrong deliveries of construction materials in construction projects give rise to dissatisfaction to all the parties involved and the main role of procurement directors and procurement managers is to make sure that supplies are delivered at the most economically advantageous tender or tender that gives the overall best value for money to specifications.

The researcher drew attention from the statistic that even though researches on the causes and effects of delay on project construction delivery time had increased noticeably, the role of procurement specifications in curbing these causes and effects has not been researched. Moreover, this research is premised on the understanding that extensive research on the nature of specifications development, including understanding: the development and contents of specifications have been steered, but not synthesized to garner knowledge on the role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector. This research provides knowledge and empirical evidence with respect to how procurement specifications can subsidise in curbing wrong deliveries of construction materials in the construction sector.

The organization of this research is as follows: Section 2 gives a conceptual, empirical underpinning of procurement specifications and, on the basis of recent literature, identify the hypotheses with respect to procurement specifications and wrong deliveries of construction materials used in practice. Furthermore, it will operationalize procurement specifications into measurable variables and formulate hypotheses. Section 3 will present survey design and design constructs for key variables. The results of this construction sector cross-industry survey are presented in Section 4. Section 5, will conclude, recommend and give direction for further research.

2. Literature underpinning

This section provides the conceptual and empirical underpinning of this research. Further, it provides a research objective, research question and the hypothesis of this research.

3. The concept of wrong deliveries

According to Lysons and Farrington (2017), wrong deliveries include deliveries that do not meet quality materials specified, deliveries of materials that are not fit for purpose and deliveries of materials that are not required by the procurers and their user departments. The concept of wrong deliveries is when the goods delivered do not match the purchase order. It is the delivery of incorrect goods.

4. The concept of procurement specifications

According to Van Weele (2017), procurement specifications can be defined as a statement of the attributes of a good or service. They indicate the required fitness for purpose or use to suppliers. Moreover, they communicate requirements from procurers to the suppliers. The types of procurement specifications are performance specifications, brand or trade name specifications and sample specifications.

5. Performance specifications

Performance specifications are used by procurers to communicate to suppliers the purpose, function, or application for which the good or service is being procured (Bailey *et al.*, 2017). It explains the uses that good must perform. They speak the operational requirements of goods or

services. The emphasis is on specifying how the product or goods and services must be able to function. Performance specifications are also called open specifications.

6. Brand or trade name specifications

According to Waters (2017), brand or trade name specifications eliminate all other names except that which has been chosen. These are also called closed specifications. They give specific goods, systems and manufacturers, with no substitutions or mechanisms to relate a substitution. They are most frequently seen when matching a specification to an existing structure, or when a particular replica is imperative.

7. Sample specifications

A sample specification refers to a situation when procurers take the actual good and present it to suppliers so as to eliminate writing up specifications that may contain errors (Van Weele, 2017). The sample specification gives an illustration of what must be supplied to the procurer.

8. Conceptual underpinning

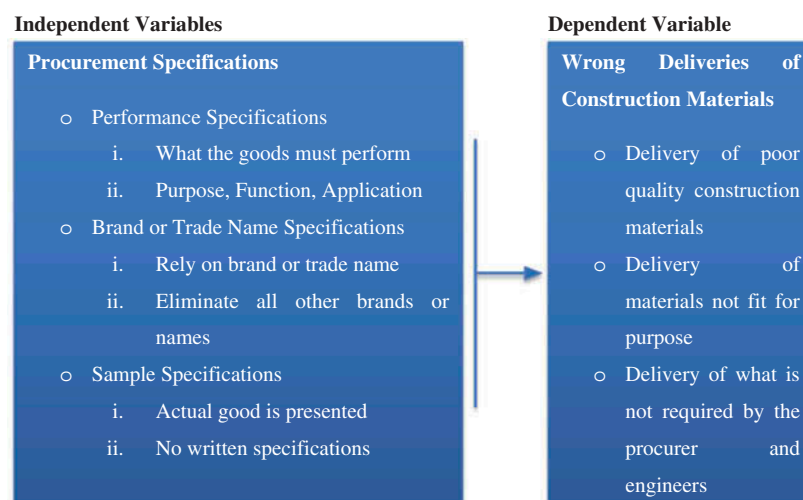
This section shows the independent variables and the dependent variable of this research. According to Munyimi and Chari (2018), (based on the research from Njeru, Njeru, Memba & Tirimba, 2015), a conceptual framework refers to a group of ideas which are scientifically organized to deliver a focus, a tool and rationale for explanation and integration of information and is generally attained in graphic illustrations. The independent variables and the dependent variable are illustrated in Figure 1.

9. Empirical underpinning

An empirical study in Italy by Strunk, Furia, Rossi, Knight and Mandrioli (2017) on the engineering roles of requirements and specification. The study was conducted to enhance the reference model to account for certain key elements that are necessary to expose and clarify the distinction and the link between requirements and specification. The researchers presented the requirements and specification for an illustrative example based on a runway incursion prevention system, with the Architrif formal language in a uml-like environment. They found that this might be done in practice by brand specifications to eliminate all other names. However, this research proposes to go beyond by adding the role of referring to a particular brand or trade name specification, providing requirements applicable only to an exact good or service in curbing deliveries of wrong construction materials. Turley (2013) investigated performance-based specifications in public procurement in Canada. The researcher analysed the need for performance-based specifications in Canada's public sector. The results of the study showed that many

Figure 1. Conceptual Underpinning.

Source: Designed by the Researcher or Author (2019)



successful approaches to sustainable public procurement already involve the use of specifications that incorporate performance, materials, design or production processes and methods of the goods or services being tendered. It was recommended that performance specifications improve sustainable public sector procurement. Nevertheless, the study did not research the role of performance specifications in curbing wrong deliveries, which this research attempts to do. Scholarly work by Carstea, Paun and Paun (2016) conducted to determine and evaluate quality management in the procurement and management of material resources in Romania. They analysed key processes of the quality management system, how quality can be managed in the process of procurement. Results indicated that performance specifications have a positive role in quality management system and in managing quality in the procurement of goods and materials of the firm. This research seeks to go beyond by using both quantitative and qualitative methods to empirically find the correlation between performance specifications and wrong deliveries of construction materials in the construction sector. Geagea, Zhang, Sahlin, Hasibi, Hameed, Rafiyan and Ekberg (2018) studied software requirements specification. They found that the problem faced when buying software requirements is that suppliers supply any alternate software requirement. They recommended that brand or trade name specifications have a positive role in procuring software requirements to avoid suppliers to supply alternate software requirement. However, their research did not contemplate the role of brand or trade name specifications in curbing wrong deliveries of construction materials in the construction sector, which this research will pursue. Another research was conducted by Sudin, Ahmed-Kristensen and Andreasen (2017) on the role of a specification in the design process found that sample specification is positively essential and should be a central issue in the design process. They recommended that procurement directors and procurement managers should specify their requirements by sample as it provides vital information for design engineers to execute the design tasks. This research goes beyond by measuring sample specifications and their influence in curbing wrong deliveries of construction materials in the construction sector. Closer home, the empirical research by Munyimi and Chari (2018) on the role of buyer-supplier relationships in achieving economic sustainability in the private telecommunication sector in Zimbabwe included demographics such as age bracket of sampled procurement practitioners, levels of education of sampled procurement practitioners and experiences in the procurement department as control variables in their research model. Hence, this research included demographics as control variables as well.

10. Research objective

The objective of this cross-industry survey of construction companies is to investigate the role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector.

11. Research question

Drawing on the objective of this research, the research question that this research seeks to answer is; what is the role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector?

12. Hypotheses of this research

Constructed on this research question, the two hypotheses for this research concerning the role of procurement specifications in curbing wrong deliveries of construction materials in the construction sector are outlined underneath:

° **Hypothesis₀**: Procurement specifications have an influence in curbing wrong deliveries of construction materials in the construction sector in Zimbabwe at ($\alpha < 0.05$) significance level.

° **Null Hypothesis₁**: Procurement specifications have no influence in curbing wrong deliveries of construction materials in the construction sector in Zimbabwe at ($\alpha < 0.05$) significance level.

13. Research methodology

This research is based on a cross-industry descriptive survey of construction companies in the construction sector. A mixed methods approach which utilises both quantitative and qualitative research methods was chosen. The population of concern in this research comprised of all the practicing procurement practitioners in the construction companies selected purposively, by Construction Industry Federation of Zimbabwe report as in December 2018. A sample of 56 procurement practitioners out of the total population of 65 respondents covering all procurement practitioners in the construction sector was selected randomly using Krejcie and Morgan (1970) formula: $S = \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P (1-P)}$. In this research, primary data were gathered using hard copy closed-ended questionnaires that were distributed by the researcher or author to the sampled procurement practitioners holding the positions of procurement manager, procurement officer, senior buyer, buyer and procurement assistant in companies in the construction sector. The Likert 5 points rating scale (1 = completely disagree to 5 = completely agree), was used to analyse responses in the closed-ended questionnaires. The open-ended interview, lasting on average 2 h, were conducted with sampled practicing procurement managers only heading the procurement management departments of construction companies to allow room for probing, backup closed-ended questionnaire answers and the open-ended interview were audio recorded and transliterated with the permission of respondents. A pilot test was carried out on 10 procurement practitioners who were different from the focal procurement respondents to identify slight weaknesses in the design and instrumentation. Piloting was essential in founding the validity of this research instruments (Sekaran, 2016). Cronbach's Alpha coefficient was utilised for testing the reliability of the closed-ended questionnaire responses where the critical point for Cronbach's Alpha coefficient is 0.7 signifying reliability and stability of results following the benchmark used by Munyimi and Chari (2018), which is based on the works from Saunders, Lewis and Thornhill (2017). Data gathered was analyzed both quantitatively and qualitatively. Before analyzing the data, it was first edited, coded and entered into excel worksheets, where the researcher used Statistical Package for Social Science software (Version 22) to analyze the data. To ensure accuracy of the data, tables were used to present the results for easier understanding and interpretation using inferential and descriptive statistics. Multiple linear regression was run to measure the role of these research variables which are set out in the objectives of this research. The multiple linear regression econometric model framed to survey the correlation between the variables is presented as below:

13.1. Multiple linear regression econometric model

$$W = \beta_0 + \beta_1(E_1) + \beta_2(E_2) + \beta_3(E_3) + \beta_4(E_4) + \beta_5(E_5) + \beta_6(E_6) + \xi$$

Where: **W**= Wrong deliveries of construction materials (dependent variable); β_0 = the intercept term (constant); ξ = error term; β_1 to β_6 = multiple linear regression coefficients for the following independent variables, respectively;

E_1 = age bracket of sampled procurement practitioners; E_2 = levels of education of sampled procurement practitioners; E_3 = experiences in the procurement department; E_4 = performance specifications; E_5 = brand or trade name specifications; E_6 = sample specifications.

Following the structure of the multiple linear regression econometric model used by Munyimi and Chari (2018), demographics characteristics (age bracket of sampled procurement practitioners, levels of education of sampled procurement practitioners and experiences in the procurement department) were included in this research multiple linear regression econometric model as control variables. To enable the multiple linear regression analysis econometric model anticipated to be appraised afore, the multiple linear regression econometric model can be used for predicting purposes. This research is going to use the coefficient of determination R^2 to consider whether the estimated multiple linear regression is not spurious, adjusted R^2 to determine the statistical reliability of the whole multiple linear regression model and the F-static to do multiple linear regression econometric model diagnostic tests (Mugenda & Mugenda, 2016).

14. Research results and discussions

In this section, empirical results and discussions of this research are reported. The empirical results and discussions were tabularized and presented as underneath.

15. Biographical statistics of the sample

The biographical statistics (age bracket of sampled procurement practitioners, levels of education of sampled procurement practitioners and experiences in the procurement department) from the questionnaire respondents are presented in Table 1.

It is marked from this research that the majority of the sampled procurement practitioners (41.1%) fall within the $31 \leq \text{age} \leq 40$ years set as shown in Table 1. Therefore, if grown-up procurement practitioners relate to professionalism then one can assume that the information provided is valid and reliable information. Nonetheless, it can be inferred from this research that there is a suitable level of nous among the sampled procurement practitioners as all the procurement practitioners in the construction sector have attained at least national certificate in procurement, the basic level of education in the procurement profession. This finding is supported by Zimbabwe Human Rights NGOs Forum (2010) view that Zimbabwe's land reform programme provided a conducive environment to the people of Zimbabwe to further their studies. Table 1 shows a relatively high number of experienced procurement practitioners with only 7.1% having been in the procurement profession for less than 5 years. Thus, if the number of years in procurement relates to professionalism then the information provided is valid and reliable.

16. Reliability statistics

Reliability Cronbach's Alpha coefficient was used for testing the reliability of the questionnaire answers, using the Statistical Package for Social Science software (Version 22). The Alpha test run on the different sections of the questionnaire shows: section A (Biographical Statistics of the Sample) 0.952; section B (Performance Specifications) 0.941; section C (Brand or Trade name Specifications) 0.938; section D (Sample Specifications) 0.929 and section E (Wrong Deliveries of Construction Materials) 0.962 due to the many subscales. The cut-off point for Cronbach's Alpha coefficients is 0.70, and in this case, all variables were found to be > 0.70 , hence from the tests, it can be safely concluded that the results of this research are reliable and stable (Munyimi & Chari, 2018).

Table 1. Biographical statistics			
Biographical Statistic	Biographical Variable	Frequency	Percentage
Age bracket of sampled procurement practitioners:	Age ≤ 30	5	8.9
	$31 \leq \text{Age} \leq 40$	23	41.1
	$41 \leq \text{Age} \leq 50$	20	35.7
	Age ≥ 50	8	14.3
Levels of education of sampled procurement practitioners:	Postgraduate	6	10.7
	Undergraduate	9	16.1
	National Diploma	23	41.1
	National Certificate	18	32.1
Experiences in the procurement department:	$0 \leq \text{Experience} \leq 5$	4	7.1
	$6 \leq \text{Experience} \leq 10$	23	41.1
	$11 \leq \text{Experience} \leq 15$	22	39.3
	Experience ≥ 16	7	12.5

Source: Researcher or Author (2019).

17. Multiple linear regression econometric model diagnostic tests

The extrapolative power of the multiple linear regression econometric model is shown by a modest coefficient of determination R^2 value of 0.871; hence the model is a good fit. The measure of the “Goodness of Fit” that is the adjusted R^2 value of 0.855 shows that the sample regression fits the data. The F—statistic 0.000 is < 0.05 ; therefore, the multiple linear regression model is significant at 5% meaning that the variations in wrong deliveries of construction materials is explained by the variations in the independent variables.

18. The role of procurement specifications in curbing wrong deliveries

This section presents, interprets and discusses the main results of logistic multiple linear regression of the independent variables against the dependent variable. Presented and interpreted in Table 2 is the multiple linear regression model summary.

Table 2 shows the coefficient of determination R^2 of 0.871 indicates that the logarithm of wrong deliveries of construction materials is explained by the logarithms of age bracket of sampled procurement practitioners, levels of education of sampled procurement practitioners, experiences in the procurement department, performance specifications, brand or trade name specifications and sample specifications by 87% and only 13% are explained by factors out the multiple linear regression econometric model. The adjusted R^2 of 0.855 shows that 85.5% of the variation in the wrong deliveries of construction materials is explained by the multiple linear regression econometric model and 14.4% of the variation is explained by other variables other than those included in the multiple linear regression econometric model. The Pearson’s $R = 0.933$, means that the dependent variable has a stout correlation with the independent variables. So, it suffices that by varying the independent variables in the multiple linear regression econometric model, the dependent variable will change in the equal way. Nevertheless, the standard error of the estimate 0.47,608 is low and satisfactory, inferring the factors analysed are not unreliable but further researches are required to analyse their usefulness. The one-way analysis of variance (ANOVA) table is illustrated in Table 3.

Table 3 shows one-way analysis of variance (ANOVA) to establish the fitness of the multiple linear regression econometric model employed. The overall multiple linear regression econometric

Table 2. Multiple linear regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.933 ^a	.871	.855	.47,608

a. Predictors: (Constant), sample specifications, levels of education of sampled procurement practitioners, performance specifications, experiences in the procurement department, age bracket of sampled procurement practitioners, brand or trade name specifications.

Table 3. Multiple linear regression one-way analyses of variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	75.108	6	12.518	55.231	.000 ^a
	Residual	11.106	49	.227		
	Total	86.214	55			

a. Predictors: (Constant), sample specifications, levels of education of sampled procurement practitioners, performance specifications, experiences in the procurement department, age bracket of sampled procurement practitioners, brand or trade name specifications.

b. Dependent Variable: wrong deliveries of construction materials.

model is statistically significant because $p < \alpha$, meaning that there was a statistically significant variance between groups as determined by multiple linear regression one-way analysis of variance (ANOVA) F -statistic (6, 49) = 55.231, probability F -static = 0.000, meaning that the multiple linear regression econometric model has prognostic clout. The F -test value 55.231 is high and hence the multiple linear regression model is statistically significant. Moreover, the econometric multiple linear regression coefficients are shown in Table 4.

Table 4 illustrates that the three control variables were not statistically significant in their influence in curbing wrong deliveries of construction materials, namely,

Age bracket of sampled procurement practitioners: pageants a negatively and insignificantly influence $\beta = -0.462$, $p = 0.171 > 0.05$.

Levels of education of sampled procurement practitioners: displays a positively and insignificantly influence $\beta = 0.013$, $p = 0.945 > 0.05$.

Experiences in the procurement department: monacles a negatively and insignificantly influence $\beta = -0.106$, $p = 0.730 > 0.05$.

The beta coefficient for performance specifications is 0.353 and p -value of 0.010 statistically significant at 5% levels of significance. The beta value for this independent variable 0.353 shows that the dependent variable, that is, curbing wrong deliveries of construction materials would change by a corresponding number of a standard deviation when the respective independent variable changes by one standard deviation. Practicing procurement managers commented on the benefits of using performance specifications to curb wrong deliveries of construction materials somewhat clairvoyantly in open-ended interviews:

"These explain the uses of that construction material which you want to procure must perform. Performance specifications on construction materials such as cement and adhesives curb the delivery of wrong construction material by the supplier because these performance specifications communicate to suppliers the purpose, function or application for which the construction material is being procured, for instance, performance specifications of cement are either heat resistant cement for constructing incinerators, super set cement for bridges, dams construction."

A procurement manager said.

Another procurement manager also said:

"In fact for adhesives like glues, you specify performance if you want water proof glues, or interior glues. These performance specifications will reduce delivery of wrong purpose, function or application construction material."

She said.

One procurement manager was also quoted saying:

"I suppose in order for practicing procurement practitioners who purchase construction goods, building materials and infrastructure materials on a significant scale to take advantage of potential savings and benefits of getting the specified materials, performance-based specifications are invaluable tools."

He said.

Multiple linear regression model independent variables		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error			
1	(Constant)	-.080	.310		-.259	.797
	E ₁ = Age bracket of sampled procurement practitioners	-.462	.333	-.314	-1.389	.171
	E ₂ = Levels of education of sampled procurement practitioners	.013	.184	.010	.070	.945
	E ₃ = Experiences in the procurement department	-.106	.305	-.068	-.347	.730
	E ₄ = Performance specifications	.353	.210	.366	1.677	.010
	E ₅ = Brand or trade name specifications	.333	.243	.318	1.374	.006
	E ₆ = Sample specifications	.755	.172	.605	4.388	.000

a. Dependent Variable: wrong deliveries of construction materials.

This result was held before seen in the literature by Carstea et al. (2016) whose results indicated that performance specifications have a positive role in the quality management system and in managing quality in the procurement of goods and materials of the firm. Hence, this is in line with the findings by Turley (2013) who found that performance specifications improve sustainable public sector procurement in Canada. There is a positive correlation between brand or trade name specifications and curbing wrong deliveries of construction materials as the beta coefficient is 0.333. Accordingly, a unit increase in the use of brand or trade name specifications will lead to 0.333 rises in curbing wrong deliveries of construction materials. The variable is statistically significant as revealed by its p-value of 0.006. Practicing procurement managers in open-ended interviews agreed that brand or trade name specifications help in curbing wrong deliveries of construction materials as one procurement manager, says:

"These are also referred to as closed specifications, definitely they helped our company in curbing wrong deliveries because we rely on brand name, hence suppliers will deliver the actual brand that we require."

He said.

Another procurement manager besides confirmed:

"In my opinion they curb wrong deliveries of construction materials because they eliminate any other alternate brands and names except that which has been chosen for their proven quality on construction materials like face bricks you specify by brand names such as rustic face bricks, palm face bricks, brush face bricks; construction pipes by names galvanized pipes, pvc pipes, copper pipes; Cement by brand names unicom cement, larfage cement, portland cement, circle cement. Indeed this will reduce wrong deliveries."

Procurement manager said.

In support, another procurement manager had this to say:

"Irrefutably brand or trade name specifications curtail wrong deliveries of construction materials because the supplier will deliver the stated or chosen brand name of construction material. In fact, brand or trade name specifications are imperious that all the construction materials required be delivered according to the agreed brand or trade name the purchase order was placed."

She said.

This finding is in contour with the recent research conducted by Geagea et al. (2018) who found that brand or trade name specifications have a positive role in procuring software requirements to avoid suppliers to supply alternate software requirements. This was supported by Strunk et al. (2017) who found that exposing and clarifying the requirements of users might be done in practice by brand specifications to eliminate all other names. Sample specifications have a p-value of 0.000 showing that it is statistically significant at 5% level of significance. There is a positive correlation between the use of sample specifications and curbing wrong deliveries of construction materials as shown by the beta coefficient 0.755 which clarifies that a unit increase in using sample specifications will lead to 0.755 units increase in curbing wrong deliveries of construction materials. The procurement managers added the reasons why using sample specifications in the construction sector curb wrong deliveries of construction materials:

"Yes specifications by sample curb wrong deliveries of construction materials because the procurer presents the actual construction material required to the supplier before delivery."

A procurement manager has said.

Another procurement manager likewise said:

"I think they curb wrong deliveries of construction materials because it eliminates writing up specifications that may contain errors."

She said.

That being said:

"I support that it is easy to take for instance the required brick force, brick, samples of the required pit sand, samples of the required river sand that the procurer want to procure and show it to the supplier or prospective bidder so as to eliminate errors, for sure this stops delivery of wrong construction materials by suppliers or bidders."

Another procurement manager said.

Another procurement manager went on to say:

"I believe that sample specifications are beneficial to both procurers and suppliers or bidders, because they enable suppliers to deliver on the basis of the sample of the construction materials, quality of the sample of the construction materials hence avoiding wrong deliveries of construction materials."

He said.

This result confirms an empirical case study by Sudin et al. (2017) who found that procurement directors and procurement managers should specify their requirements by sample as it provides vital information for design engineers to execute the design tasks. Replacing the multiple linear regression coefficients in the multiple linear regression econometric model gives the following multiple linear regression econometric model when the independent variables are changed.

$$o \quad W = -0.080 - 0.462(E_1) + 0.013(E_2) - 0.106(E_3) + 0.353(E_4) + 0.333(E_5) + 0.755(E_6) + \xi$$

$$(.797) \quad (.171) \quad (.945) \quad (.730) \quad (.010) \quad (.006) \quad (.000)$$

Nonetheless, at 5% level of significance, performance specifications, brand or trade name specifications and sample specifications have a significant effect in curbing wrong deliveries of construction materials in the construction sector with p-values of 0.010, 0.006 and 0.000, respectively, and hence their multiple linear regression coefficients should be retained in the final multiple linear regression econometric model. The p-values associated with the coefficients for age bracket of sampled procurement practitioners, levels of education of sampled procurement practitioners and experiences in the procurement department is 0.171, 0.945 and 0.730 an implication that although the control variable have an influence in curbing wrong deliveries of construction materials in the construction sector, their effect is insignificant and so it may be released in reporting the final multiple linear regression model. Therefore, predictor multiple linear regression econometric equation for curbing wrong deliveries of construction materials multiple linear regression econometric model becomes:

$$o \quad W = -0.080 + 0.353(E_4) + 0.333(E_5) + 0.755(E_6) + \xi \text{ in unstandardized form}$$

$$(.797) \quad (.010) \quad (.006) \quad (.000)$$

$$o \quad W = 0.366(E_4) + 0.318(E_5) + 0.605(E_6) \text{ in standardized form}$$

$$(.010) \quad (.006) \quad (.000)$$

As ascertained by the predictor multiple linear regression econometric model, the use of sample specifications contributes the utmost in curbing wrong deliveries of construction materials charted by use of performance specifications as shown by their higher beta coefficients. Use of brand or trade name specifications has the scrawnier role in curbing wrong deliveries of construction materials.

19. Conclusions, recommendations and direction for further research

Based on a cross-industry survey of practicing procurement directors, procurement managers, procurement officers, buyers and procurement assistants in the construction sector, this research concludes that performance specifications usage for construction materials with specific purpose, function or application is positively associated with curbing wrong deliveries of construction materials. Practicing procurement managers converge in a positive way with this quantitative result, especially on construction materials such as cement and adhesives. The results from this research multiple linear regression econometric model concluded that wrong deliveries of construction materials known for their proven quality can equally be cramped using brand or trade name specifications. As specified by procurement managers in open-ended interviews, brand or trade name specifications are imperative that all the construction materials required be delivered according to the agreed brand or trade name the purchase order was placed. In conclusion, the researcher or author observed that the use of sample specifications is effective in curbing wrong deliveries of complex construction materials. It was clear from practicing procurement managers' sentiments in open-ended interviews that use of sample specifications is a central element in curbing wrong deliveries of construction materials on complex construction materials. It is on the aforementioned eye-opening empirical findings the researcher or author wants to endorse very specially to practicing procurement directors, procurement managers, procurement officers, buyers, procurement assistants and procurement policymakers such as the Procurement Regulatory Authority of Zimbabwe the following:

- Procurement practitioners should use performance specifications for construction materials with specific purpose, function or application such as cement and adhesives so as to explain the uses of that construction material which they want to procure must perform to suppliers, to curb wrong deliveries of construction materials in the construction sector. To do so, these performance instructions should be clear, achievable, measurable and enforceable, outlining the functional requirements for the product or service being procured.
- Practicing procurement professionals should use brand or trade name specifications for construction materials that rely on brand names known for their proven quality such as face bricks, cement, pipes so as to eliminate any other alternate brands and names except that which has been chosen and agreed brand or trade name the purchase order was placed to suppliers to curb wrong deliveries of construction materials.
- The procurement should use sample specifications to suppliers on construction materials with complex specifications such as using samples of the required pit sand, samples of the required river sand so as to present the actual construction material required to suppliers or prospective bidders and eliminate writing up specifications that may contain errors. This enables suppliers or bidders to deliver on the basis of the sample of the construction materials, quality of the sample of the construction materials hence avoiding wrong deliveries of construction materials.
- Practicing procurement directors, procurement managers, procurement officers, buyers and procurement assistants must be educated on the benefits and proper use of procurement specifications, testing methods and the acceptance criteria that will be used to verify and

enforce the requirements in the request for quotations (RFQ), request for proposals (RFP), invitation to tender (ITT) documents which should be clearly specified and may even be required for pre-qualification of prospective bidders or suppliers.

- There are interesting boulevards for further research following this research. First, additional research might empirically analyse whether these procurement specifications would help curtail construction projects risk and whether they would provide support, should there be any legal disputes between procurers and suppliers.
- Future research should include an empirical research on the following concepts in legal aspects in procurement: would these procurement specifications provide procurement practitioners the Locus Standi in Judicio? Will these procurement specifications enable procurement practitioners to claim damages payable in the event of a procurement contract breach? Will these procurement specifications enable procurement practitioners to enforce remedies for breach of procurement contracts such as the Actio Redhibitoria, the Actio Quanti Minoris, specific performance (informa specifica) and in the doctrine of subrogation? Will these procurement specifications provide support in cases of reciprocal mistakes, unilateral mistakes and fraudulent misrepresentations?

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Honour thy Father and Mother

Hearken unto your father who begot you, and do not loathe your mother when she is old
 Proverbs 23 verse 22

Honour thy father and thy mother: that thy days may be long upon the land which the LORD thy God giveth thee
 Exodus 20 verse 12

Honour thy father and mother; which is the first commandment with promise
 Ephesians 6 verse 2

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