The Mediation Effect of Procurement Competence on the Relationship between Practices and Performance of the Public Sector Procurement in Tanzania using Higher-order Constructs in SmartPLS

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Abstract

Nowadays, organizations are focusing more on operations improvement through proper management of their supply chains. Procurement management as part of supply chain management can play a significant role in operations improvement through better procurement performance. This study examined the determinants of public procurement performance. Based on the dynamic capability view together with empirical evidence from the literature a model with two pathways the direct and indirect path was developed. In the model, the extent of procurement practices was positively related to procurement performance through procurement competence. The study used cross-sectional survey data collected from a sample of 207 key informants from the public procurement sector in Tanzania. The results indicate significant positive effects for both direct and indirect paths of procurement practices to procurement performance. However, the indirect path effect through procurement competence was stronger than the direct path. Findings demonstrate the importance of procurement competence in improving procurement performance in the public sector organizations. Moreover, these results have theoretical, methodological, managerial and policy implications. The study adds to methodological applications of partial least square researches especially those involving higher order constructs. To practitioners, the study highlights procurement competence as a key factor that need to be considered to improve the performance of procurement management in organizations.

Keywords: Procurement Practices; Procurement Competence; Procurement Performance; Dynamic Capability; Higher-Order Constructs

Introduction

In the current organizational environment, supply chain management has emerged as a source of competitive advantage or organizational performance, as it has been argued that firms nowadays compete through planning, service improvement, flexibility and cost reduction through the entire supply chain (Ganeshkumar & Nambirajan, 2013). Furthermore, with its capability of playing part in an organization's performance and sustainable competitive advantage supply chain management, particularly purchasing has been involved as part of the strategic function of an organization (Foerstl, Franke & Zimmermann, 2016). Additionally, purchasing activities have changed from the operational function to the strategic function (Gupta & Narain, 2012; Gupta & Tripathi, 2018). In line with this, procurement as part of supply chain can play a role in operation improvement through better procurement performance management (Dobrzykowski, Hong & Soon Park, 2012).

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Literature indicates a significant number of studies mainly focusing on the supply chain as a whole and in the private sector with an emphasis to supply chain management strategies, practices and performance and paying little attention on public sectors and on the role of mediators on the relationships between variables (Colin, Galindo & Hernández, 2015; Makabira & Waiganjo, 2014; Gawankar, Kamble & Raut, 2017; Moon, 2005; Quesada, González, Mueller & Mueller, 2010). Nevertheless, studies pinpoint a clear distinction between procurement in public and private sector organizations, with the main distinction based on the issues of conservatism, regulations involved in procurement undertakings, size of procurement, diversity, financer of procurement services (Guarnieri & Gomes, 2019; Johnson, Leenders & McCue, 2003; Prier, Schwerin & McCue, 2016). Knowing the huge difference that exists between public and private sector procurement this study, therefore, focused on the supply side of the supply chain specifically procurement in the public sector since the quality of a final product or service can only be as good as the quality of the inputs they receive from suppliers (Anuar, 2015; Forker, 1997).

Studies indicate several antecedents of procurement performance among which includes competence referred to as capability (Mishra, Devaraj & Vaidyanathan, 2013), resources and integration capability (Ordanini & Rubera, 2008), procurement practices (Alsetoohy & Ayoun, 2018; Quesada et al., 2010). Additionally, the reviewed literature gives evidence of an indirect effect on the relationship between procurement practices on public procurement performance, with studies indicating significant positive relationships on practices and competencies while other studies indicating significant positive relationships on competence and performance (Chow et al., 2008; Das & Narasimhan, 2000; Derwik & Hellström, 2017; Ellinger et al., 2012; Tan, 2002). Furthermore, based on a new perspective of Resource-Based View (RBV) with dynamic capability which emphasizes a link on resources, dynamic capability and performance (Eisenhardt & Martin, 2000) the researcher was motivated to examine whether on introducing the mediation effect on the relationship between procurement practices and performance could lead into the new recommendations towards procurement performance. Therefore, on considering procurement competence as a dynamic capability this study provides a significant contribution to empirical literature and the extension of Resource-Based View (RBV) to include issues of dynamic capability.

Historically, procuring entities in the public sector have faced many challenges. Mainly, these challenges are in three categories, performance related, strategic and technological challenges (citation). In Tanzania, the government spends about 70% of its budget on procurement, making it a key focus of government institutions (PPRA, 2018). Additionally, efficient handling of this huge size of procurement has been a concern for policymakers and a challenge to procurement practitioners in the public sector. Moreover, public sector procurement in Tanzania has also been challenged by inadequate knowledge in procurement among participants (Rasheli, 2017). Based on the theoretical and empirical evidence, this study examined the mediating role of procurement in the relationship between procurement practices and procurement performance in public sector organizations in Tanzania. Specifically, the study first explored the direct relationships between the constructs and further explored the mediation effect of procurement competence.

The study provides a significant contribution to researcher's putting more emphasis on resource-based view with dynamic capability. The practitioners may gain insight on how competencies

might impact the day to day performance of public sector procurement. Policymakers may use findings from this study to formulate new policy recommendations by incorporating competence related issues for public sector procurement improvement. The next sections cover the literature review, hypothesis development, conceptual framework, methodology, results, discussion, implications and areas for further studies.

Literature Review

Theoretical Framework

Reviewed procurement studies indicate an increasing trend of using theories despite its lower percentage of applications in previous studies (Flynn & Davis, 2014; Koala & Steinfeld, 2018). A study by Koala and Steinfeld (2018) ranked the theory building in public procurement research at the tester level with an increasing trend of articles related to theoretical contribution. However, the majority of the theories used in procurement studies emanate from different fields such as sociology, management, psychology, and more predominantly from economics (Flynn & Davis, 2014). The main reason for the lack of theoretical applications in the field of procurement can the newness of the field in academia and the contradictions in defining public procurement (Flynn & Davis, 2014; Koala & Steinfeld, 2018; Prier & McCue, 2009). Given the evidence that the field is greatly undertheorized, this study has incorporated the call for researchers to involve the theories so that to increases the validity of the result and to help practitioners make better decisions guided by theory (Flynn & Davis, 2014; Koala & Steinfeld, 2018).

To improve efficiency in the public sector operating under a dynamic environment, studies recommend the use of theories that focus on the resources, capabilities and interior structure of an organization (Szymaniec-Mlicka, 2014). Among those theories is a resource-based view (RBV) of the firm. Existing literature has used the RBV to describe the relationship between firm's resources, capabilities and firm's performance (Eisenhardt & Martin, 2000). The RBV involves three major constructs; namely, firm's performance (both financial and operational), organization's resources, and capabilities (Liang, You & Liu, 2010). Linking these three constructs has been one of the problematic issues under the RBV. That has led to an extension of the RBV to a dynamic capability view which links the three constructs. This view is based on an argument that long term competitive advantage of the firm depends on the resource configurations that are built by dynamic capabilities (Eisenhardt & Martin, 2000).

Furthermore, the literature indicates that RBV with its extensions (RBV-Ext) is not valued under the public sector as much as in the private sector where specific resources and capabilities are key for sustainable competitive advantage(Szymaniec-Mlicka, 2014). A study by Bryson et al. (2007) has demonstrated the relevance of the resource-based view with its extensions in public organizations. The concept of resource looks similar in both public and private sector organizations, however, in the former, the competition is geared towards efficiency gains through the use of resources hence obtain a larger portion of the limited public funds (Jasinska, 2020). Despite the significant use of RBV-Ext in the strategic management studies in the competitive private sector settings, its recent use in the public sector has focused on the distinctive performance differences between organizations (Harvey, Skelcher, Spencer, Jas & Walshe, 2010; Pee & Kankanhalli, 2016). Studies argue that public organization success is based on internal resources utilizations to enhance the public value at the lowest possible cost (Bryson et al., 2007). The resource-based view focuses on value creation that is, resources are used to create value

(Rosenberg Hansen & Ferlie, 2016). In this, value is viewed in a wider aspect rather than value to the shareholders. The literature related to RBV focuses on efficiency (Teece, Pisano & Shuen, 1997) which is more relevant in a public organization.

As per Eisenhardt and Martin (2000) dynamic capabilities has been defined as "the firm's process that uses resource specifically the process to integrate, reconfigure, gain and release resources to match even create market change". The inclusive definition of dynamic capability was defined by Winter and Zollo (2002) as "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." As proposed by Teece (2007) dynamic capabilities are based on competencies such as flexibility, the complimentary intelligent system and professionals with technical competence. Studies conceptualize firm competencies as resources that can create a unique value to a firm either alone or in conjunction with other resources (Liu, Ke, Wei & Hua, 2013; Prasad & Green, 2015). This study argues that procurement competence in conjunction with procurement practices can lead to better procurement performance, especially in the public sector procurement.

Literature pinpointed two types of capabilities, namely, the lower level functional/functional capability and the higher level dynamic capability (Mishra, Devaraj & Vaidyanathan, 2013). The functional capability allows firms to perform functions while the dynamic capability focuses on the change, renewal and transformation of the existing capabilities. Oh, Yang and Kim (2013) noted that a capability could be either dynamic or collaboration capability. The dynamic capability is viewed as the ability of a firm to address the rapidly changing environment through resource integration, configuration and building. The collaboration capability entails the ability of the firm to collaborate with suppliers external to the organization and cooperate within (among organization departments working together) to ensure efficient utilization of resources. For this study, procurement competence was regarded as a capability for an organization and as per Oh, Yang and Kim (2013), procurement dynamic capability was taken as an ability of the public procurement management unit to respond quickly to any changes and lowering the formalities that normally exist in public organization management. Also, the procurement collaborative capability included the ability of the procurement management unit to work closely with key suppliers to the organization and also the ability of the procurement department to work with other departments commonly known as user departments or internal customers. Therefore, this study by incorporating the issues of procurement competence as a mediating variable provides a link between procurement practices and procurement performance as proposed by the dynamic capability view.

Empirical Literature and Hypotheses Development

Research indicates an existence of a significant positive effect on supply chain practices to organization performance (Chow et al., 2008; Ibrahim, 2011; Lenny Koh et al., 2007). Moreover, studies indicate the significant relationship between public procurement practices and public procurement performance (Alsetoohy & Ayoun, 2018; Bag, 2012; Eyaa & Ntayi, 2010; Makabira & Waiganjo, 2014; Quesada et al., 2010). Alsetoohy and Ayoun (2018) found hotel food procurement practices to positively impact the food procurement performance in Florida. The study by Foerstl et al. (2016) grounded on the resource-based view found a significant contribution of internal procurement management practices on operational performance. Furthermore, studies in developing countries' public sector setting have limited focus on procurement practices and

performance relationship. On the account of the discussed literature, this study proposes the following hypothesis.
H_1: Procurement practices positively relates to procurement performance.

To achieve higher performance outcomes, firms nowadays strive for better resources and competencies as a lack of them could halt the firm (Heilmann, Lintukangas & Peltola, 2011). Mckevitt et al. (2012) argued that procurement competence normally can be developed based on the organization culture and experience acquired by procurement personnel through working in an organization as it does not account for skills acquired through the formal schooling process. Also, Das and Narasimhan (2000) argued that developing a purchasing competence requires the use of purchasing practices that are related to the achievement of business goals. Furthermore, Chow et al., (2008) found a significant association between supply chain practices as an independent variable and competence as a dependent variable. Thus, through this argument, we can propose a relationship where procurement practices positively affects competence.
H_2: Procurement practice positively relates to procurement competence

Literature reviewed revealed the importance of competence in supply chain management as it can always lead to improvement in business performance, both financially and operationally (Derwik & Hellström, 2017). These studies called for researchers to consider competence in their studies. The area of procurement competence have not been extensively researched, having a limited number of studies focusing on supply chain management competence focusing in the manufacturing sector (Ellinger et al., 2012; Ganeshkumar & Nambirajan, 2013). Based on the literature, studies have indicated a significant positive association between supply chain competence on organization performance (Chow et al., 2008; Ellinger et al., 2012; Tan, 2002). Furthermore, the study by Das and Narasimhan (2000) concluded a positive relationship between purchasing competence and the determinants of performance namely; cost quality and delivery. Moreover, a study by Ellinger et al. (2012) using data from manufacturing industries noted supply chain competence to highly impact organization performance in terms of shareholders value and customer satisfaction. Therefore, this literature evidence leads to the formulation of the following hypothesis.
H_3: Procurement competence positively relates to procurement performance

This study further argues that procurement competence has a mediating role on the relationship between procurement practices and procurement performance. The reviewed literature indicated that procurement practices leads to procurement competence (Chow et al., 2008; Das & Narasimhan, 2000) and procurement competence leads to procurement performance (Chow et al., 2008; Ellinger et al., 2012; Tan, 2002). Furthermore, a resource-based view with dynamic capability theory indicates the possibility of procurement competence to be applied as a potential determinant of procurement performance as a mediator variable. Thus, this study identified this study gap by incorporating the variable 'procurement competence' as a potential mediator in the model under study. Therefore, the researcher suggested that procurement practices have an indirect effect on procurement performance through procurement competence.
H_4: Procurement practices positively relates to procurement performance through procurement competence

Research Model

Based the empirical and theoretical literature review and the resulted hypothesis statements, figure 1 presents research model that was proposed for this study.

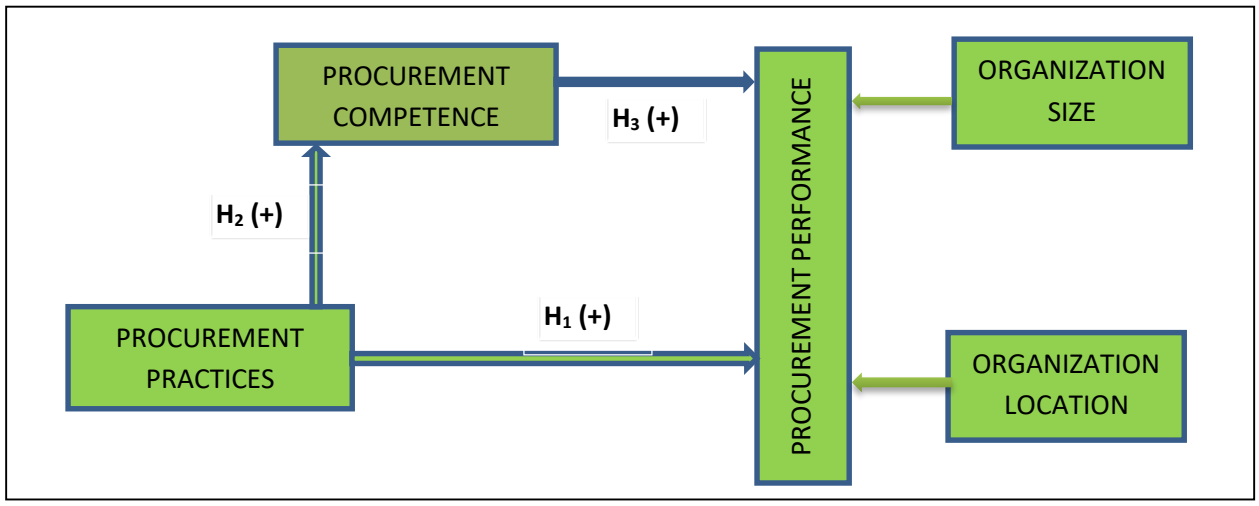

Figure 1: Research Model Developed by the Researcher based on the Reviewed Literature

Methodology

This study was built upon objectivism ontology aiming at theory testing (citation) and followed the positivism epistemology based on the belief that truth is out there to be discovered (citation). Considering cost and time constraints, the cross-sectional design was opted for this study. As per the Tanzania Public Procurement Regulatory Authority (PPRA), in 2018 there were 540 registered procuring entities of which implied that the study population composed of 540 organizations. As studies indicate, a sample size of at least 100 respondents is suitable when using structural equation modelling (Hair et al., 2006; Schumacker & Lomax, 2004), sample size for this study was set at 200 key informants one from each organization which is above the minimum sample proposed in literature (Pallant, 2011; Tabachnick & Fidell, 2013). However, the study managed to collect more than 200 questionnaires and after data screening the study end up with a total of 207 duly observations, making over 100% response rate, qualifying for analysis.

Non-probabilistic sampling strategy based on subjective judgement was opted to avoid the issue of reluctant respondents and thus allow the researcher to select a sample or unit based on specific purpose rather than random (Teddlie & Yu, 2007). Due to its simplicity in administering, reliability, cost saving, the questionnaire was adapted as the instrument for collecting data and it was administered in person to all respondents. The questionnaire initially was sent to three academicians who are experts in the area of procurement and three practitioners who have been practicing public procurement for a quite number of years. All of the recommendations from the reviewers were incorporated into a modified questionnaire and a pilot study was done for 30 procuring entities with the aim of diagnosing the scale related problems and to ensure reliability and validity. The data obtained from the pilot study were examined and the feedbacks were incorporated into a final draft questionnaire.

Conceptualization and Operationalization of the variables

Main variables were adopted from previous research (Alsetoohy & Ayoun, 2018; Kuei, Madu, Chow & Lu, 2005; Mishra, Konana & Barua, 2007; Quesada et al., 2010) with minimal modifications and all were latent variables. Thus, they needed to be translated into measurable items, and hence be used in data collection. The literature further suggests some criteria that can help to decide the appropriate epistemic relationship namely; direction of causality, interchangeability of measurement items, covariation among indicators, and nomological net of the construct's measurement items (Jarvis, MacKenzie & Podsakoff, 2003). Therefore, considering these criteria advocated by Jarvis et al., (2003) in combination with other criteria, the latent variables under this study were modelled as reflective latent variables. For the main variables, the respondent used a 5-point Likert scale on a range from 1 representing "not at all" to 5 "to a great extent".

Procurement performance (PROCPERF) was conceptualized as a performance advantage due to procurement process that takes into consideration the measure of efficiency and cost-saving in the procurement process (Alsetoohy & Ayoun, 2018; Mishra et al., 2007; Quesada et al., 2010). The variable adapted consisted of higher order constructs constituting three first order constructs namely internal customer performance (ICP), internal performance (IP) and supplier-related performance (SRP). Respondents were asked to rate the public procurement performance based on those items based on a five points Likert scale according to their experiences.

Procurement practices (PROCPRAC) also was conceptualized as a higher-order construct using all five dimensions of procurement practices. The dimensions are information gathering (IG), supplier contact (SC), contracting-negotiation and fulfilment (CNF), requisitioning-negotiation and fulfilment (RNF) and intelligence analysis - negotiation and fulfilment (IANF) as proposed by Alsetoohy and Ayoun, (2018) and Quesada et al., (2010) together with preliminary recommendations from public procurement experts and practitioners. The respondents were required to indicate the extent of practice on the identified items in their procurement management unit (PMU).

For procurement competence (PROCCOMP), Derwik and Hellström (2017) identified competence as the combination of capability and resources, knowledge, skills and ability. This study adopted the measurement proposed by Kuei, Madu, Chow and Lu, (2005) and preliminary recommendations from public procurement experts and practitioners. The respondents were requested to indicate the extent that reflects their PMU current level of procurement competence based on the items indicated in the questionnaire.

Organization size (ORGSIZE) as a control variable was proxied using the total employees number in an organization (Teo, Lin & Lai, 2009 Yu et al., 2016). This measure is widely used in business studies and here it was measured as a dichotomous variable with 1 indicating medium and large size organization and 0 indicating micro and small size organizations. Organization location (ORGLCN) for this research was measured as a dichotomous variable with 1 indicating procurement management unit is located at rural area and 0 indicating a procurement management unit is located at urban.

Results

Data Screening

The data collected was inspected for data entry accuracy, missing , suspicious response pattern, outliers assessment and normality assessment and finally the study assessed the issue of common method bias as advocated by scholars (Aguinis, Gottfredson & Joo, 2013; Hair, Hult, Ringle & Sarstedt, 2017; Hair Jr, Black, Babin & Anderson, 2014; Tabachnick & Fidell, 2013).

Measurement Model Evaluation

The study opted for variance-based structural equation modelling analysis by means of partial least squares using the SmartPLS 3 software (Ringle, Wende & Becker, 2015). Since the model involved hierarchical components in handling measurement issues, a researcher drew on repeated indicator approach for specification in partial least square path model (Becker, Klein & Wetzels, 2012; Hair, Sarstedt, Ringle & Gudergan, 2018; Wetzels, Odekerken-schröder & Oppen, 2009; Wold, 1982). Since our model involves reflective-reflective second order construct, the measurement for the repeated indicators in second order construct were also measured reflectively (Henseler, Ringle & Sinkovics, 2009; Wold, 1982). For analysis of the results, two stages were used, first by assessing the measurement models followed by structural model assessment (Hair et al., 2017). On assessing the degree of measurement error validity and reliability as important characteristics of a measure were used by researchers (Hair Jr et al., 2014). Findings for the reliability and convergent validity are presented in details as shown in Table 1.

Table 1: Construct Reliability and Validity

2nd Order Construct	CR[b]	AVE [c]	1st Order Construct	Item	Loading[a]	CR[b]	AVE [c]
Procurement Practices (PROCPRAC)	0.822	0.50	Information Gathering (IG)	IG1	0.699	0.855	0.596
				IG2	0.736		
				IG3	0.852		
				IG4	0.793		
			Supplier Contact (SC)	SC1	0.711	0.847	0.581
				SC2	0.816		
				SC3	0.749		
				SC4	0.770		
			Contracting, Negotiation and Fulfillment (CNF)	CNF2	0.804	0.899	0.640
				CNF3	0.845		
				CNF4	0.771		
				CNF5	0.767		
				CNF6	0.81		
			Requisitioning, Negotiation and Fulfillment (RNF)	RNF1	0.642	0.796	0.569
				RNF3	0.837		
				RNF4	0.770		
			Intelligent Analysis (Negotiation and Fulfillment) (IANF)	IANF1	0.748	0.895	0.588
				IANF3	0.807		
				IANF4	0.775		
				IANF6	0.729		
				IANF7	0.791		
				IANF8	0.747		
			Procurement Competence (PROCCOMP)	PPC1	0.761	0.900	0.600
				PPC2	0.832		
				PPC3	0.771		
				PPC4	0.791		
				PPC5	0.764		
				PPC6	0.723		

Procurement Performance (ROCPERF)	0.862	0.680	Internal Performance (IP)	IP1	0.777	0.917	0.647
				IP2	0.865		
				IP3	0.820		
				IP5	0.801		
				IP7	0.788		
				IP8	0.773		
			Supplier Related Performance (SRP)	SRP2	0.886	0.869	0.690
				SRP3	0.853		
				SRP4	0.747		
			Internal Customer Performance	ICP1	0.805		
				ICP2	0.769		
				ICP3	0.807	0.943	0.675
				ICP4	0.793		
				ICP5	0.836		
				ICP6	0.877		
				ICP7	0.874		
				ICP8	0.803		

Notes

- Items which are below 0.5 and those between 0.5 and 0.7 that negatively affect average variance extracted (AVE) were removed; CNF1, RNF2, IANF2, IANF5, IP4, IP6, SRP1
- 'a': all items loading above 0.5 indicates indicator reliability (Hulland 1999)
- 'b': A value of CR>0.7 indicates internal consistency reliability (Hair et al., 2017)
- 'c': A value with AVE>0.5 indicates convergence reliability (Hair et al., 2017)

Under this study, most of the retained items had factor loadings above 0.7 with the exception of IG1 and RNF1 which contain loadings above 0.6 hence providing evidence of indicator reliability (Hair et al., 2017; Henseler, Ringle & Sinkovics, 2009). Construct reliability for second order constructs were manually calculated as proposed by Hair et al (2017) while the reliability for the first order construct were directly obtained from the SmartPLS output. Table 1 shows that all values for the composite reliability for both lower and higher order constructs were greater than 0.7, indicating the presence of internal consistence in the underlying constructs (Hair et al., 2017). For the higher order latent variable, the average variance extracted values (AVE) were computed manually while the AVE for lower order constructs were directly captured from the SmartPLS output (Becker et al., 2012). The table also shows that the convergent validity was achieved because all of the values of the average variance extracted for both higher and lower order constructs were greater than or equal to 0.5, providing a clear indication that each construct explains more than half of the variances of its indicator (Hair et al., 2017).

For discriminant validity, this study extended the discriminant validity assessment by looking at the Heterotrai-Monotrait ratio of correlation (HTMT) which was proposed by Henseler et al. (2014). The HTMT value below 0.9 for the path model including constructs that are conceptually similar or HTMT value below 0.85 when the path model are more distinct indicate discriminant validity between reflective constructs (Hair et al., 2017; Hair, Sarstedt & Ringle, 2019; Henseler et al., 2014). Under the model for this study, Table 2 below indicates the highest HTMT value is 0.707, thus providing a clear indication that the latent variables discriminant validity is acceptable, thus a clear satisfactory measurement model quality.

Table 2: Discriminant Validity on Heterotrai-Monotrait Ratio (HTMT)

	CNF	IANF	ICP	IG	IP	PROCCOMP	RNF	SC	SRP
CNF									
IANF	0.515								
ICP	0.223	0.379							
IG	0.323	0.552	0.401						
IP	0.298	0.438	0.707	0.335					
PROCCOMP	0.252	0.568	0.696	0.423	0.618				
RNF	0.426	0.584	0.241	0.417	0.302	0.366			
SC	0.310	0.500	0.290	0.554	0.388	0.381	0.398		
SRP	0.270	0.414	0.569	0.298	0.551	0.437	0.151	0.323	

Notes: The HTMT value should be a value below 0.85 to indicate establishment of discriminant validity between reflective constructs.

Model Estimation and Findings

It is a requirement to assess the collinearity issues (Hair et al., 2017) since the presence of multicollinearity could lead to the biasness of the path coefficient as in regular multiple regressions. Therefore, findings as in Table 3 indicate the maximum number of VIF value as 1.325 which is far below the threshold value of 3. Thus, one can conclude that the model is free of collinearity problems (that is collinearity is not an issue) and can be used for further path model analysis.

As indicated in Table 3 and in Figure 2, all estimations in the proposed model relationships were significant, thus supporting the hypotheses stated under this study. Procurement competence indicated the strongest relationship with public procurement performance (0.563), followed by procurement practices (0.182). Together, the two constructs explain more than 45% of the variation in public procurement performance ($R^2 = 0.453$).

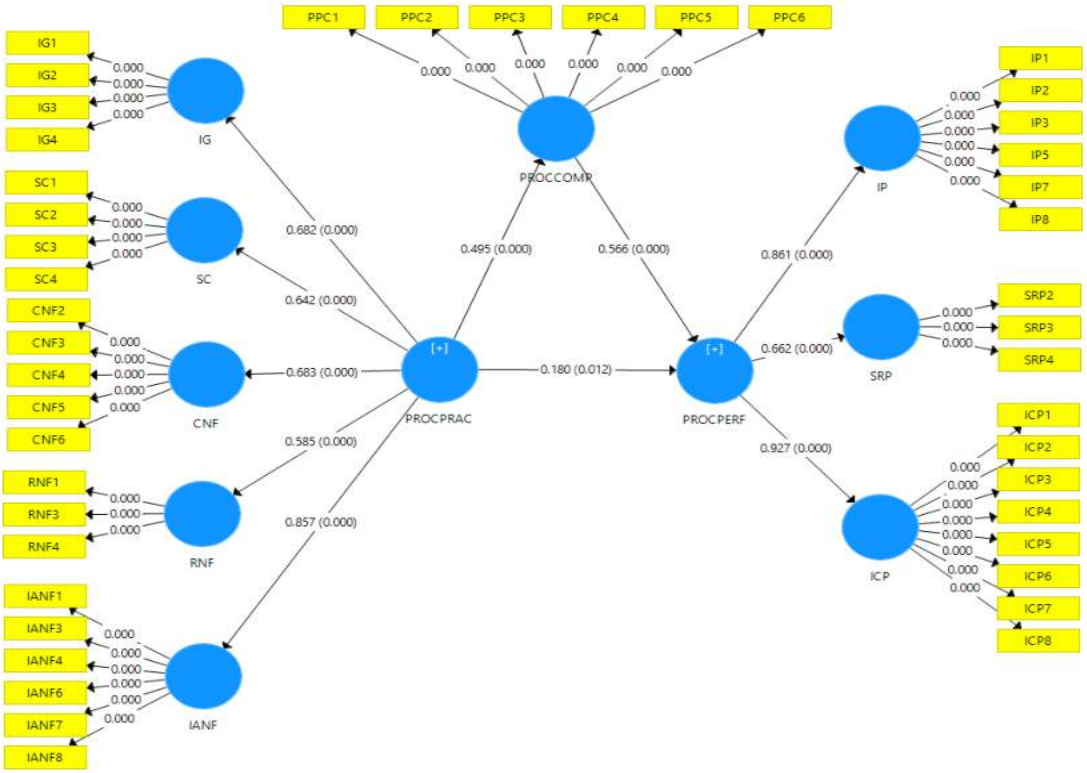

Figure 2: PLS Path Model Results

Table 3: Direct Relationship for Hypothesis Testing

Relationships	Standardized Beta	Standard Error	t Value	f^2	q^2	95% CI LL	95% CI UL	VIF
PROCPRAC -> PROCPERF	0.182	0.072	2.500*	0.045	0.013	0.041	0.326	1.325
PROCPRAC -> PROCCOMP	0.497	0.077	6.449*	0.325	0.152	0.336	0.635	1.000
PROCCOMP -> PROCPERF	0.563	0.064	8.841*	0.442	0.139	0.432	0.683	1.325

Notes:

- ** p<0.01; * p<0.05
- Effective size (f^2) measures the impact of the specific predictor latent variable on an endogenous latent variable: f^2 range of 0.02 small, 0.15 medium, 0.35 large (Cohen, 1988; Hair, Risher, et al., 2019).
- VIF<3 indicates no strong indication of multicollinearity (Hair, Risher, Sarstedt & Ringle, 2019)

Table 3 indicates the minimum value of effective size (f^2) is 0.045 which is far above the small effective size threshold. This provides an indication that though our path models are significant, they are relevant. The Q^2 for procurement performance (0.206) and procurement competence (0.132) were all above zero providing a clear indication of the existence of path model predictive relevance for each given endogenous latent variable (Table 4).

Table 4: Findings for R2, R^2 adjusted and Q^2 Values

Endogenous Construct	R^2	Q^2
PROCPERF	0.453	0.206
PROCCOMP	0.245	0.132

R^2adjusted (PROCCOMP=0.241 PROCPERF= 0.448)

Q^2 used to indicate models out of sample predictive relevance or predictive power, whereby when $Q^2>0$ indicates existence of path model predictive relevance for a particular endogenous construct.

The values of q^2 were calculated manually and as shown in Table 3, the q^2 value of 0.013 for public procurement performance and public procurement practices as an exogenous construct was relatively very small. The q^2 value of 0.152 indicates that a public procurement practice has a medium predictive relevance for public procurement competence. The q^2 value of 0.139 indicates that a public procurement competence has a small predictive relevance for public procurement performance.

For mediation analysis assessment, the study used the procedures as proposed by Hair et al. (2017) which is the update of the procedures by Hair et al. (2014). The procedure involves first analyzing weather the indirect effect is significant followed by analyzing weather the direct effect is significant. When the direct and indirect effects are significant then we have a partial mediation, thus we need further to analyze whether the mediation is a competing mediation or complementary mediation.

Table 5: Indirect Relationship for Hypothesis Testing

Relationships	Standardized Beta	Standard Error	t Value	95% CI LL	95% CI UL
PROCPRAC -> PROCCOMP -> PROCPERF	0.279	0.051	5.452**	0.179	0.381

Note: ** p<0.01 * p<0.1

The result as indicated in Table 5 shows that the indirect effect was significant because none of the confidence intervals included a zero. The t value of the indirect effect (0.279) for the PROCPRAC to PROCPERF via PROCCOMP is 5.452 with a p-value of 0.000. Moreover, on checking the direct effect from PROCPRAC to PROCPERF as shown in Table 3 the direct path was weak (0.150) but statistically significant ($t = 2.030$; $p < 0.05$). This lead to a conclusion that PROCCOMP partially mediates the PROCPRAC to PROCPERF relationship. Furthermore, after the computation of the product of the direct and indirect effect their product was positive, thus we concluded that PROCCOMP represents partial complementary mediation of the relationship from PROCPRAC to PROCPERF.

Variance accounted for (VAF) for a partial complimentary mediator was computed to realize how important the mediator is. The results as shown on Table 6 the PROCPRAC to PROCPERF path, of the total effect 60.52% goes through mediator PROCCOMP.

Table 6: Variance Accounted for (VAF) for complimentary mediators

Relationships	Direct Effect	Indirect Effect	Total Effect	VAF
PROCPRAC -> PROCCOMP -> PROCPERF	0.182	0.279	0.461	60.52%

Impact of Control Variables

To take into account of alternative explanations of the findings and at the same time to reduce the error term and increase statistical power, two control variables 'organization size and organization location were included on this study (Becker, 2005). Since all of these control variables were categorical, they were included in a model as dummy variables with organization size modelled with two dummies where the medium and large sized organization dummy was included in the model while the micro and small size organization was considered as a reference variable. Also, organization location had two dummies whereby the urban location dummy was included in the model and rural location dummy was considered as a reference variable. The model with control variables were ran in SmartPLS 3 software (Ringle, Wende & Becker, 2015). The outputs were as shown in Figure 3.

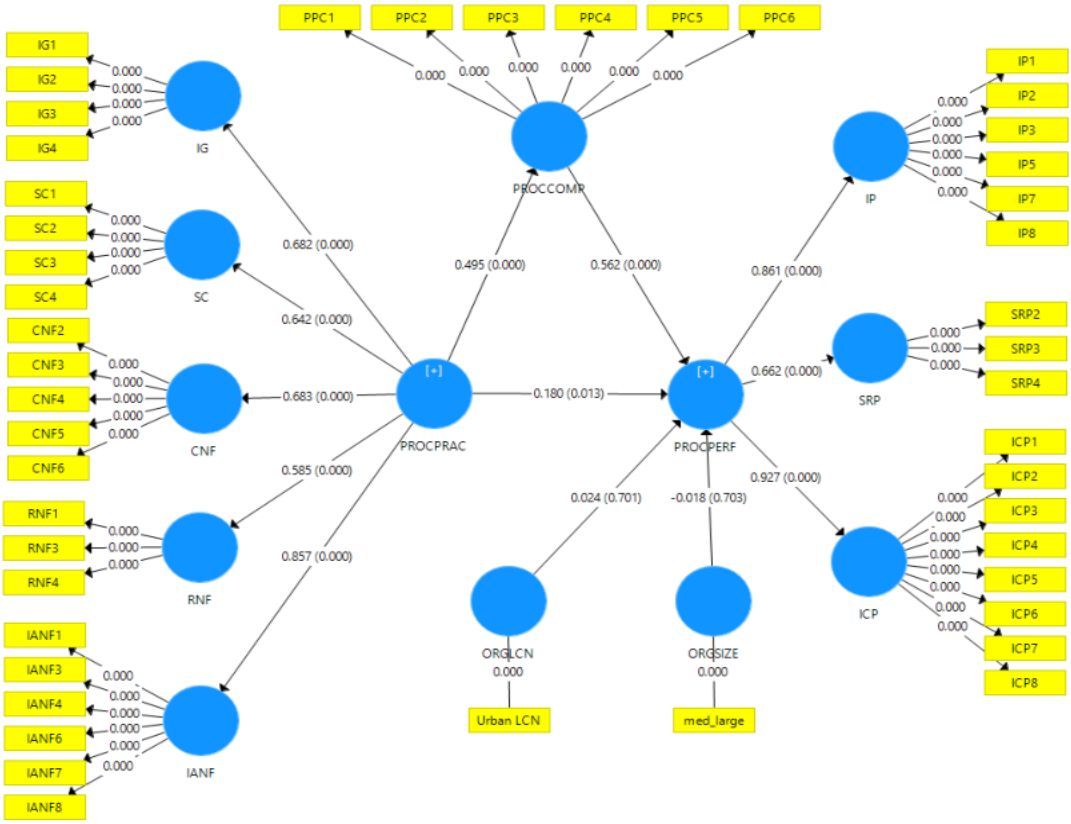

Figure 3: PLS Path Model with Control Variables Results

These results were compared with the results obtained in the model without the control variables to examine whether there is any difference between the two models and the results for the comparisons are as shown in Table 7. In case the standardized coefficients of the independent variables with and without control variables differ by less than 0.1 then the differences are negligible and therefore the results without control variables will only be reported and ignoring those with control variables(Becker, 2005; Becker et al., 2016).

Table 7: Comparison Results for the model with and Without Control Variables

Independent Variables	Coefficients (Without Control Variables)	Coefficients (With Control Variables)	Differences	Decision (<0.1 insignificance difference)
PROCPRAC	0.180	0.180	0.000	Insignificant
PROCCOMP	0.566	0.562	0.004	Insignificant

Thus, by observing the results as in Table 7, all of the independent variables differences were less than 0.1. This provides justification of ignoring the results with control variables as they have insignificant contributions in the model. Furthermore, the bootstrapping results indicated all control variables to be insignificant in explaining the endogenous latent variable.

Importance Performance Map Analysis

To identify the issues that needs to be improved in order to increase the public procurement performance an importance-performance map analysis (IPMA) was conducted with public procurement performance as and endogenous target construct variable.

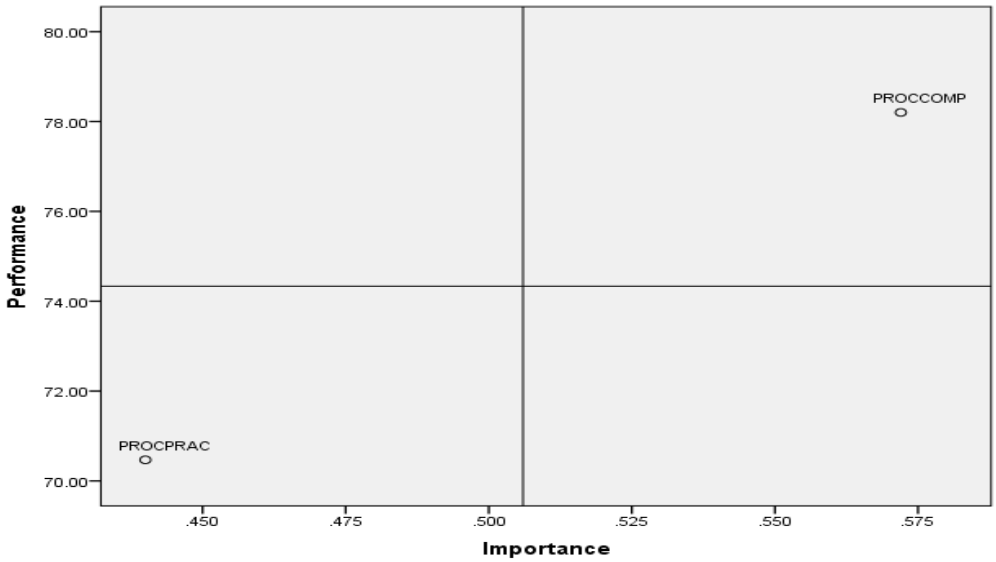

Figure4: Importance-Performance -Map (Constructs Level*)*

According to the result as in Figure 4, procurement competence (PROCCOMP) is important and performing well. That is to say, a unit increase in PROCCOMP will increase the public procurement performance (PROCPERF). Thus, it holds to advice managers who want to increase the public procurement performance to work on improving the public procurement competence as their priority.

To identify more specific areas of improvements, an importance-performance map analysis at indicator level was also developed as shown in figure 5. Indicators for procurement competence (PROCCOMP) have both the highest importance and higher performance. Thus, managers with priority is to increase the public procurement performance are advised to pay more attention on improving all procurement competence indicators.

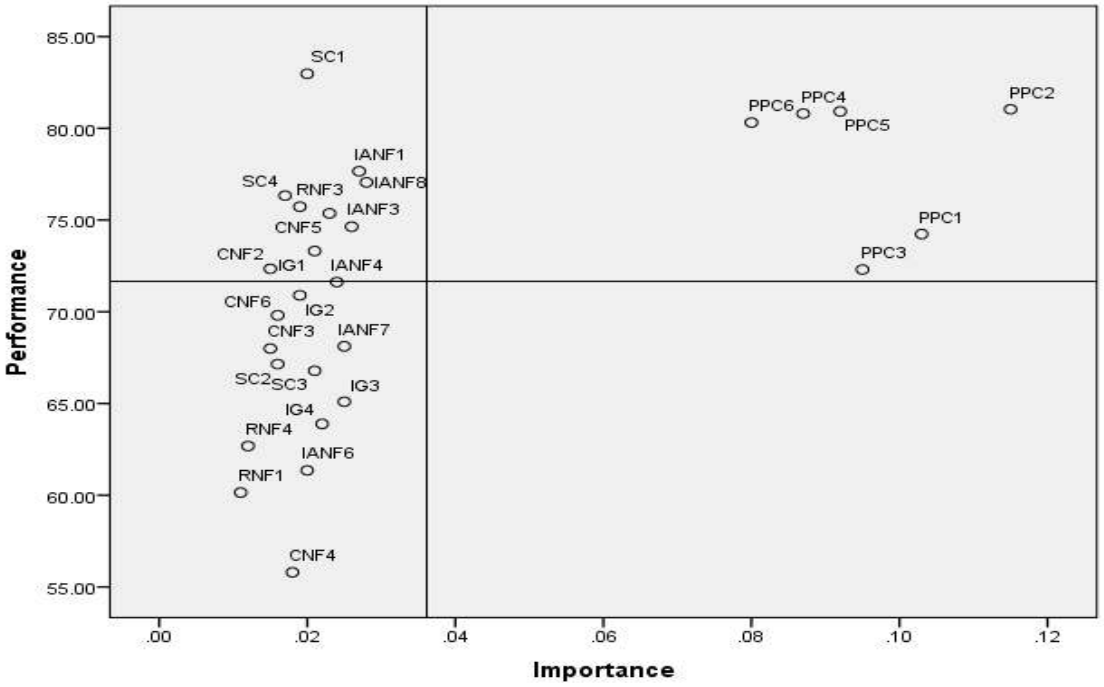

Figure 5: Importance-Performance -Map (Indicators Level*)*

Discussion of the Findings and Theoretical Implications

The effect of procurement practices on procurement performance was partially supported (β=0.182, $p<0.05$ two tails); this result is in line with the first hypothesis statement. This finding is in line with previous findings which in the same way provided evidence on the proposed positive associations between procurement practices and procurement performance (Bag, 2012; Chow et al., 2008; Eyaa & Ntayi, 2010; Makabira & Waiganjo, 2014; Quesada et al., 2010; Sukati, Hamid, Baharun & Yusoff, 2012). Furthermore, the second hypothesis statement regarding procurement practices on procurement competence was also supported (β=0.497, $p<0.01$ two tails). This finding also supports the previous findings which in the same way provided evidence on the proposed positive associations between procurement practices and procurement competence (Chow et al., 2008; Das & Narasimhan, 2000). Moreover, the hypotheses related to public procurement competence and public procurement performance was also supported (β=0.563, $p<0.01$ two tails). This finding also supports the previous findings which in the same way provided evidence on the proposed positive associations between competence and performance(Chow et al., 2008; Das & Narasimhan, 2000; Ellinger et al., 2012; Tan, 2002).

Additionally, the results under this study indicated a significant indirect effect on the path between procurement practices and procurement performance through procurement competence (β=0.279, $p<0.01$ two tails). This provided clear evidence on the role of procurement competence as a mediator on the relationship between procurement practices and procurement performance as hypothesized in hypothesis four. The finding is in line with the new perspective of the resource-based view which emphasizes resources, dynamic capability and performance. Therefore, on considering procurement competence as dynamic capability this study provides a significant contribution to empirical literature and the resource based view (RBV) with dynamic capability.

Methodological and Managerial Implications

This study involved a number of methodological issues that are less discussed in the previous studies. The study used a reflectively higher order constructs and the analysis was done by using SmartPLS3. Many studies in partial least square use the first order constructs, thus the study adds to methodological applications of partial least square researches especially those involving higher order constructs. Also, apart from calculating the convergent validity and internal consistent reliability of the lower order constructs, the study has computed the values of the internal consistent reliability and convergent reliability of the higher order constructs. This is an addition to this research as many studies involving higher order constructs included only the convergent validity and internal consistent reliability of the lower order constructs. Also, the data used for this study was obtained from the public sectors organizations. Studies on the relationship between procurement practices and procurement performance based more on collecting data from manufacturing companies with little or no any direct attention in the public sector. Thus, this study provides a significant contribution by focusing much on procurement practices and procurement performance on public organizations.

The study highlights the key factors that need to be considered in order to improve the performance of procurement management in organizations. The positive impacts of practices and competence on performance suggests that the ability of procurement practitioners to achieve higher procurement performance depends on higher level of procurement practices, and possession of high level of procurement competencies. The suggestion is further supported by the results from importance- performance map analysis as it shows how importance is the variable procurement competence and it can lead to higher performance. Specifically based on the importance-performance map results for individual items mangers are advised to concentrate on all items of the procurement competence variable. Additionally, the indirect paths from procurement practices to performance through procurement competence indicated the path to be more important as it accounts for high variance (60.52% of the total effect). Thus, managers are advised to consider the indirect paths through competence so that they can realize higher performance in their procurement management.

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