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Enhancing municipal e-procurement using inventory stock control: South African design approach

Abstract

The control of stock is imperative to ensure efficiency and effectiveness of municipal e-procurement. The main purpose of this study is threefold: to identify critical factors influencing e-procurement; to assess strategies used by inventory stock control to improve successful e-procurement; and to explore significant relationships between inventory stock control and e-procurement, in the South African municipalities, with specific reference to the KwaZulu-Natal (KZN) Province. This study uses the 5Ps theoretical framework (purpose, principles, processes, people and performance). This census study was descriptive, cross-sectional and quantitative in nature with 62 questionnaires administered by members of staff at procurement of the South African municipalities. Data are analyzed with the aid of the Statistical Package for Social Sciences (SPSS) version 21.0. The results indicate that stock inspection, control strategies, organizational support, staff skills and involvement, and sustainability of the 5Ps attributes are the main promotional tools for inventory stock control to improve e-procurement in the South African municipalities. Interestingly, the hypotheses of the study are accepted and the departments reveal a significant relationship with purpose ($p = .008^*$), people ($p = .021^*$), principles ($p = .004^*$), and organizational support ($p = .008^*$). The study recommends strategic advancements in the stock control to improve e-procurement, and it also recommends that other researchers to test and validate a proposed model.

Keywords: inventory stock control, processes, purpose, principles, people, e-procurement.

JEL Classification: L94.

Introduction

Governments in the world, at all levels, have invested significant resources in municipalities with mixed results (Huefner, 2011). E-procurement at municipalities has become more complex and fragmented, and the question how it should be controlled has become more critical especially on inventory stock costs (Wei, Wang and Qi, 2013). Failure of municipalities to control e-procurement may result in a financial crisis, leading to poor service delivery to the community (Dolfsma, 2011). Schatteman (2010) indicated that they have many problems experienced in the municipalities around the world regarding procurement of goods and services. Likewise, the same tricky problem of poor e-procurement was evident in 2011/2012 when the majority of the South African municipalities received an unclean audit report (Nombembe, 2012). Literature suggests that local governments tend to have poor inventory stock controls by e-procurement, particularly in the developing countries (Audit to build public confidence, 2011). Wei et al. (2013) support the premise that not much evident research has been done to investigate factors influencing e-procurement in both public and private sectors, yet it is a major concern among local governments. There are so many questions to be asked regarding e-procurement of inventory stock by public sectors. The quality of e-procurement at municipalities is still surrounded by the assumption that the high rate of failure might be due to the poor

quality of supplies or poor financial management. This problem is supported by many researchers indicating that poor application of procurement could be caused by lack of knowledge and poor management (Chiang, 201; Huefner, 2011; Umakanta and Chaitanya, 2012). Municipalities must consider themselves as profit-making organizations that are operating in a competitive marketing place. This is because municipalities are also faced with many trials such as increased competition, lack of support from key constituencies, an increase in the size and diversity of the working station, dealings with changing technology, increased calls for accountability, a higher demand for quality by all the stakeholders involved, more responsibility for research, teaching, and greater emphasis on efficient and effective financial management (Luby, 2013). Therefore, the aim of the study is to find out whether inventory stock control can help to enhance municipal e-procurement in South Africa, with specific reference to the KwaZulu-Natal (KZN) Province. The objectives of the study are; to identify critical factors influencing e-procurement; to assess strategies used by inventory stock control to improve successful e-procurement and to explore significant relationships between inventory stock control and e-procurement.

1. Theoretical framework

This study used the 5Ps as its theoretical framework. The advantages of using the 5Ps include that of being universal and flexible for control application processes in any organization. According to Pryor, Anderson, Toombs and Humphreys (2007), the 5Ps model was officially developed in 1998 by the 3

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experts in the field of strategic management, namely; Pryor, White and Toombs. The 5Ps consider various firms' environments such as the internal strengths, weaknesses, external threats, and opportunities (SWOT), as well as the mission, vision, core values, goals and objectives, strategy formulation and deployment, performance measurement and feedback of critical success factors. The theoretical framework has indicated collective approaches, which take purpose, principles or processes, people and performance into account.

2. Defining municipal inventory control

The question what is inventory control can be answered once the concept "control" is well understood. Keith and Rene (2008) define "control" as a transposition of theory into practical exercise, e.g., keeping track, and processing acquisitions or ordering, receiving and issuing stocks. The concept "inventory control" on the other hand is defined (Hailing and Guochao, 2011) as a process in which the materials and parts carried in stock are regulated within pre-determined limits or set in accordance with the policy and procedures implemented or adopted by the organization. Municipality inventory stock on the other hand can be described as a form of materials, stocks or supplies to be consumed in the production process or held for sale or distribution in the ordinary course of operations (Bijulal, Venkateswaran and Hemachandra, 2011). According to Stock and Lambert (2001), as cited by Mpwanaya (2005) municipal inventory stock is categorized into many types, such as: cycle stock, in-transit stock, buffer stock, speculation stock, seasonal stock, and dead stock.

Municipalities would decide to hold some of their inventories. However, this decision has its own pros and cons. For example, Mpwanaya (2005) mentions that there are six following reasons that inspire municipalities to hold inventories for short and long periods of time. These may include: economies of scale, balancing supply and demand, specialization, protection from uncertainties, and Buffer interface.

3. Municipal inventory stock control

Inventory stock control is an approach to monitor, inspect or count the inventory stocks, and is likely to be performed by small, medium and large organizations that handle minor and large quantities of stock (Chiang, 2013). The need to control municipal inventory stocks includes cutting down possible costs like stock-out costs, warehousing and logistic costs, insurance costs, spoilage/breakage losses, materials handling costs, and depreciation costs (Singh, Sahu and Nayak, 2012). Stock and Lambert (2001) are in view that the level of inventory costs serves as an indicator as to how the municipality controls its

stocks on a regular basis. According to Kok and Shang (2007), inventory stock control helps to reduce the level of errors pertaining to inventory records and physical count like stock loss or shrinkage, transaction errors (in inbound or outbound processes), and product misplacement. Mpwanaya (2005) emphasizes that inventory stock control helps to ensure that inventory costs are reduced to a minimum level. Through inventory stock control, public sectors can eliminate inventory losses such as stock deterioration and improper distribution of customer orders (Singh and Kumar, 2010). Minner and Transchel (2010) explain that a good inventory stock control can improve financial performance. The need for inventory stock control includes that of separating inventory stocks by nature. Possibly, this may include procurement responsibility of setting out the levels of inventory stock requirements for a specific time period (Bijulal, Venkateswaran and Hemachandra, 2011). Liberatore (2011) reveals that inventory stock control is a responsibility that needs to be performed by knowledgeable individuals and must be appointed by the organization. Nevertheless, practice of inventory stock control requires an advanced technology such as stock keeping unit and bar-coding technologies of which they are foremost techniques in which inventory stock control can be dealt with to reduce stock losses (Umakanta and Chaitanya, 2012). Of these technologies, bar-coding systems have gained a momentum and their usefulness includes that of reducing errors on the internal control systems (Nassar and Hegab, 2006; Nelson, 2010; Birkinshaw and Heywood, 2010). However, it is imperative to make sure that internal control systems are strong (Umakanta and Chaitanya, 2012). According to Huefner (2011), a strong internal control system can be categorized with good strategies for inventory stock control. A good strategy can improve stock purchase decisions, save time and money, increase efficiency, and improve customer services.

4. Relationship between inventory stock control and e-procurement

E-procurement can be defined as an electronic process to acquire and receive goods and services in the organization. E-procurement prepares and processes demand as well as the end receipt and approval of payment for goods and services that have been received (Intaher and Johanna, 2012). This shows that e-procurement has a direct influence on inventory stock control as it can play a significant role to ensure that the suppliers take responsibility to provide inventory stock orders when it is required (Erdis, 2013). It is for this reason therefore that the South African government has decided to promulgate the Preferential Procurement Policy

Framework Act (PPFA), Act No. 5 of 2000 (Atkinson and Sapat, 2012). The primary objectives towards this promulgation was simply to ensure fairness, equity, transparency, competitiveness and cost effectiveness in the control of inventories by procurement divisions (Watermeyer, 2011). However, an exploratory-based study of public sectors conducted in South Africa by Intaheer and Johanna (2012) indicates incompetency, unfairness, inequitable, and poor strategies as the most challenging factors restraining the effectiveness of e-procurement to control inventory stocks.

E-procurement can be improved by reviewing the inventory stock control (Naidoo et al., 2011). A census study, using a qualitative approach, which was conducted among 82 businessmen of micro and small scale enterprises, based on Law No. 2 of 2008 in Takalar District South Sulawesi Province, indicated that control has a direct link with performance (Intaheer and Johanna, 2012). Similar results were found by Xiaoya, Marler and Zhiyu (2012) from their study on the relationship between performance and control.

5. Factors influencing e-procurement

Factors influencing e-procurement can be the use of outdated technological systems, lack of financial support, and unwillingness of staff to participate in the course (Allal-Cherif and Babai, 2012). A survey-based study conducted from 153 manufacturing and 53 distribution companies by Jonsson and Mattsson (2008) indicated planning as the most important factor for e-procurement. On the other hand, Bouzida et al. (2011) is in agreement with Mohammaditabar, Hassan and O'Brien (2012) that keeping an inventory track has an influence on e-procurement.

6. Improving e-procurement through inventory stock control

6.1. Purpose of control. A questionnaire-based study was conducted and responses from 60 managers in Sudan Khartoum public sector (Abdalkrim, 2013) indicated that explaining the purpose of inventory stock control can lead members of staff to understand the objectives of e-procurement. Explaining the purpose of inventory stock control can also help to shed light on its overall need; provide a path, and facilitate decision making. However, communicating this intended purpose can also support members of staff in their awareness to know what is expected from them (Ching-Chow and Tsu-Ming, 2009). To balance inventory stock on records with physical numbers requires e-procurement to have a clear consideration of the purpose (Wei, 2012). Knowing the purpose of inventory stock control can be characterized by good strategic goals,

sales forecasting, sales and operations planning, production, materials requirement planning, and good financial management (Bouzida, Logrippo and Mankovski, 2011). Though inventory stock involves a considerably large working capital, Minner and Transchel (2010) indicate that, due to incompetent staff, most public sectors do not realize the influence of inventory stock control on e-procurement.

6.2. Principles of control. Principles of inventory stock control serve as guidelines to show how discipline and matters concerning e-procurement and its related costs should be realized during the course of operation (Pryor et al., 2007). As a strategic tool, Greenley (2011) suggests that enhancing the level of information sharing and communication can help members of staff to understand principles of inventory stock control. To other public sectors, it has been suggested that clear principles of inventory stock control can play a vital role in reducing inventory misconducts thus improving financial control and e-procurement (Ballard, 2010). Similarly, Hailing and Guochao (2011) indicate that, due to failure to regulate inventory within pre-determined limits, most public sectors especially in the developing countries, suffer problems of financial control and poor e-procurement. Singh et al. (2011) and Bouzida et al. (2011) believe that principles of inventory stock control can reduce inventory record errors and inadequacy warehousing procedure. Moreover, Umakanta et al. (2012) mention that maintaining minimum and maximum reordering levels by e-procurement are the core principles to be ensured in the inventory stock control.

6.3. Control processes. An experimental-based study conducted by Gottschalk and Gudmundsen (2010) in Norway among 305 employees indicated that there is a positive link between successful application of inventory stock control and employees' understanding of e-procurement. Nevertheless, there are a number of factors affecting successful application of inventory stock control, e.g., complex processes (both manual and electronic) and diffusion by employees to comply (Naidoo and Wu, 2011). According to Pryor et al. (2007), a success or failure of e-procurement processes can be measured through inventory stock control results. Ching-Chow and Tsu-Ming (2009) explain that the efficacy of inventory stock control processes require shared information that will allow participants to understand the importance of their individual input. As public sectors experience numerous problems in the application of e-procurement, Ballard (2010) suggests that it is imperative for managers to monitor e-procurement reports regularly.

6.4. People involved. People play a big role in successful e-procurement, but Gottschalk and Gudmundsen (2010) reveal that grouping many people togeth-

er to participate in the process can corrupt the entire system. A qualitative study by Naidoo and Wu (2011) indicates a remarkable result from the interviewed manager who explained that “in the e-procurement system, only relevant individuals need to participate”. Authors (similarly, Nikbin, Saad, and Ismai, 2010; Naidoo and Wu, 2011; Gottschalk and Gudmundsen, 2010) highlight that a group of people can influence the manner in which e-procurement is in control. A study conducted by Nikbin et al. (2010), using a survey data collection from 102 managers in various public sectors of the northern region of Malaysia, indicated that the effort to access the ability and trustworthiness of employees to carry out e-procurement issues is vitally important. For example, poor inventory stock control can be a cause of failure to evaluate and access available resources for arrangements to suit abilities of e-procurement (Aldehayyat and Anchor, 2010). Correspondingly, a study conducted by Naidoo et al. (2011), using a mixed method in UK, US, Australia, and New Zealand with questionnaires distributed to 570 mid-level international e-procurement experts, indicated that e-procurement is successful if dimensions of commitment, strategy, and people’s role factors are taken into account. In this respect, it is imperative for the executive management to give support that is necessary for employees to cope with difficulties during the process of inventory stock control (Ramanigopal, 2012). Normally, difficulties of inventory stock control require management to be creative and observant, and, if not, an organization needs to hire experts. Due to high level of costs to pay experts, Pryor et al. (2007) promote the involvement of highly experienced staff in the process of inventory stock control. Nevertheless, the success in carrying out any task in the public sector can be affected by external people, e.g., government or citizen’s intervention (Barbu and Lonescu, 2012). Furthermore, Naidoo et al. (2011) mention that they are a number of factors which may affect successful application of inventory stock control such as people’s beliefs and mismatches with vision.

7. Research design

The overall response rate for the survey for this study was 92.54%. From a total of 67 questionnaires that were despatched, 62 were fully completed. Welman, Kruger and Mitchell (2011) advocate that,

a sample size larger than 25 and less than 500 is most appropriate for research studies. This was a census study, which was descriptive, cross-sectional and quantitative in nature. The target population selected for this investigation consisted of members of staff from Stores Divisions and Procurement divisions of the South African municipalities. The researcher targeted this population because of their involvement in inventory stock control.

A questionnaire was used to collect data from the staff. The questionnaire comprised of a general section where all the biographical information was formed and a section dealing with the factors influencing e-procurement to control inventory stock. A mix of the nominal items, ordinal items, and ratio items in the questionnaire were employed. Apart from a biographic section with nominal and ratio items, all variables concerning the factors influencing e-procurement to control inventory stock and staff performance were measured using the ordinal items of a 3-point Likert scale (i.e., agree, neutral disagree). In total, the survey instrument comprised of 14 questions.

7.1. Data reliability and validity. The data analysis was performed using the Statistical Package for Social Sciences (SPSS). Reliability tests performed by this study were conclusive for all the questionnaire items (Cronbach’s alpha > 0.5). The survey’s data satisfied two validity tests, namely; face validity and construct validity tests. These tests were performed with all ordinal items. The average confidence level of all tests was 0.798, thus concluding that the reliability of the study was acceptable.

7.2. Data analysis. Descriptive and inferential statistics were used to analyze the quantitative data in the form of tables and pie charts. The inferential techniques included the use of correlations and chi square test values which are interpreted using the p-values. Data were analyzed with the aid of the Statistical Package for Social Sciences (SPSS) version 21.0. The level of significance was set at 95% ($p = 0.05$). The graphs and tables presented were extracted from Microsoft Excel to further clarify the findings.

8. Research findings and discussion

Using frequencies and percentages for data presentation, this section describes the biographic profile of 57 respondents such as name of department, experience and education, as shown in Table 1.

Table 1. Biographical details

Description	No. of respondents N = 62	Percentage 100%
Departments:		
Stores division	45	72.6%
Procurement	17	27.4%
Total	62	100%

Table 1. (cont.). Biographical details

Description	No. of respondents N = 62	Percentage 100%
Years of experience:		
0 to 3yrs	10	16%
3 to 6yrs	9	14.5%
6 to 9yrs	11	17.7%
9 to 12yrs	8	12.9%
12 to 15yrs	11	17.7%
15 and above	13	21%
Total	62	100%
Level of education:		
School level	30	48.4%
Certificate after matric	23	37%
Diploma	8	12.9%
Degree	1	1.6%
Total	62	100%

Table 1 indicates that the vast majority of the respondents (72.6%) in this study were from stores division, and 27.4% of the respondents were from procurement division. Basically, the study targeted stores division as a department in the organization responsible for safekeeping the inventories, but other relevant role players affiliated with controlling of inventory stocks were also selected.

As indicated in Table 1, 21% of the respondents had fifteen and above years of experience, 17.7% had between twelve and fifteen years of experience, 17.7% of the respondents had between six and nine years of experience. 16% had between 0 and three years of experience. 14.5% had between three and six years of experience, and 12.9% had between nine and twelve years of experience. It can be drawn from results that majority of the respondents had more than 15 years of experience. This is also borne out by the high reliability values observed.

Approximately 48.4% of the respondents had a school level qualification, 37% had a certificate after matric, 12.9% had a diploma qualification, and 1.6% had a degree qualification. These findings indicate that a large percentage of employees have lower level qualifications.

The respondents from the South African municipalities were asked to indicate their perception on the process of stock inspection followed by the stores divisions (Figure 1).

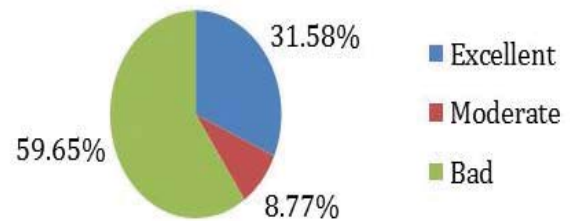


Fig. 1. Perception on inspection of stock on receipt

Figure 1 shows that nearly 60% of the respondents indicated that a stock inspection process on receipt is bad, 31.58% indicated that it is excellent, and 8.77% indicated that it is moderate. It is evident that the lack of an effective stock inspection process has been responsible for poor inventory stock control at the municipality.

There are a number of e-procurement factors influencing the control of inventory stock as illustrated in Figure 2.

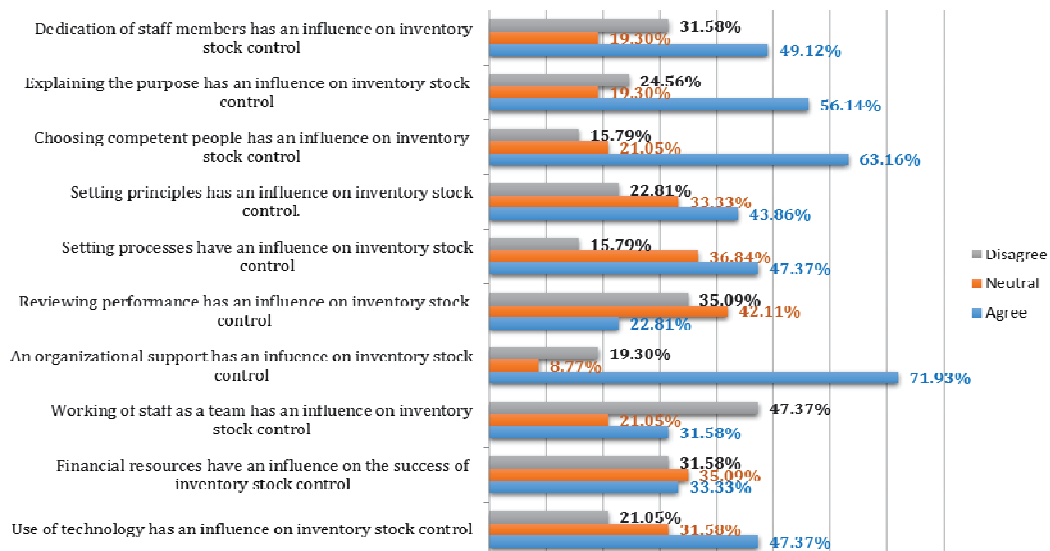


Fig. 2. Inventory stock control factors influencing e-procurement (QS1-QS10)

Figure 2 reflects a strong level of agreement for many of the inventory stock control factors influencing municipal e-procurement. The results indicate that the majority (49.12%) of the respondents agreed that dedication of procurement staff has a positive influence towards inventory stock control, while 31.58% of the respondents disagreed, and 19.30% of the respondents were neutral. The study further reveals that 56.14% of the respondents agreed that explaining the purpose of inventory stock control has an influence towards performance, 24.56% of the respondents disagreed, and 19.30% of the respondents were neutral. It is noteworthy that 63.16% of the respondents agreed that choosing competent people to lead inventory stock control has an influence towards performance, while 21.05% of the respondents were neutral and 15.79% disagreed. Interestingly, the vast majority (43.86%) of the respondents agreed that setting principles is influential on inventory stock control, 33.33% of the respondents were neutral and 22.81% of respondents disagreed. 47.37% of the respondents agreed that setting processes has an influence on inventory stock control, 36.84% were neutral, and 15.79% disagreed. Many of the respondents were not clear whether performance review plays a crucial role to make inventory stock control a success. This is evident by 42.11% of the respondents who were neutral with the statement, while 35.09% disagreed, and 22.81% agreed. In concluding the results, it is important for

procurement management to enhance inventory stock control systems and educate and train employees to apply the critical processes and principles of sound inventory stock control.

The majority (71.93%) of the respondents agreed that organizational support plays a huge role for procurement to achieve good inventory stock control however 19.30% disagreed and 8.77% were neutral with the statement. These empirical results concur with Lamanauskas (2012) that procurement is the main driver of inventory control policies. Therefore, it is important for the municipality to provide efficient and effective support to procurement in order to improve an inventory stock control.

The majority (47.37%) of the respondents disagreed that a teamwork can have a positive impact for procurement to control an inventory stock, whereas 31.58% agreed, and 21.05% were neutral. 35.05% of the respondents were neutral that financial resources have an impact on inventory stock control, while 33.33% agreed, and 31.58% disagreed. 47.37% of the respondents agreed that the use of technology has an influence on inventory stock control, 31.58% were neutral, and 21.05% disagreed. In this respect, Allal-Cherif and Maira (2011) are of the opinion that financial resources and use of advanced technological systems to control the inventory stock can help to improve performance.

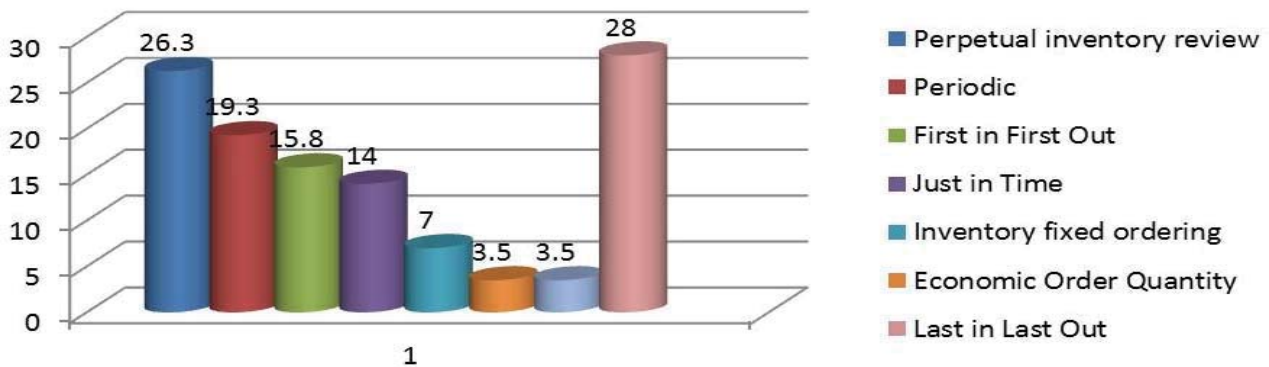


Fig. 3. Inventory stock control strategies used to improve e-procurement

The results in Figure 3 show that 28% of the respondents from inventory stock control do not use any of the listed strategies to improve e-procurement, 26.3% use perpetual inventory review, 19.3% use periodic inventory review, 15.8% use First in First Out (FIFO), 14% use Just in Time (JIT), 7% use inventory fixed ordering, 3.5% use Economic Order Quantity (EOQ), and 3.5% use Last in First Out (LIFO). To conclude the results, it is found that the municipal e-procurement does not use a common strategy to control the inventory stocks.

8.1. Hypotheses results. According to Malhotra and Birks (2006), a chi-square test is used to test the statistical significance of the observed association in a cross tabulation. It assists in determining whether a systematic association exists between two variables. A significant result is indicated with “ $p < 0.05$ ”. The test was performed to demonstrate whether there were direct or inverse proportional relationships between the research variables. These results are presented in Table 2.

Table 2. Correlations of the questionnaire statements

Questionnaire statements (QS)		QS1	QS2	QS3	QS4	QS5	
Spearman's rho	QS6. Reviewing performance plays a big role to make inventory stock control a success	Correlation Coefficient	+ .224	+ .003	- .190	- .090	+ .156
		Sig. (2-tailed)	.094	.984	.158	.503	.246
		N	62	62	62	62	62
	QS7. An organizational support plays a big role to achieving a good inventory stock control	Correlation Coefficient	+ .574**	+ .330*	+ .158	+ .184	+ .294*
		Sig. (2-tailed)	.000	.012	.241	.170	.027
		N	62	62	62	62	62
	QS8. Working of staff as a team have a positive impact on inventory stock control	Correlation Coefficient	+ .526**	+ .478**	+ .221	+ .204	+ .281*
		Sig. (2-tailed)	.000	.000	.099	.128	.034
		N	62	62	62	62	62
	QS9. Financial resources have an impact on inventory stock control	Correlation Coefficient	+ .371**	+ .382**	+ .189	+ .068	+ .197
		Sig. (2-tailed)	.005	.003	.158	.617	.141
		N	62	62	62	62	62
	QS10. Use of technology has an influence on inventory stock control	Correlation Coefficient	+ .328*	+ .451**	+ .349**	+ .151	+ .085
		Sig. (2-tailed)	.013	.000	.008	.262	.530
		N	62	62	62	62	62

Notes: **. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

All positive associated variables are indicated by a + sign whilst negative are indicated by a - sign. For example, Table 2 indicates that there is a positive relationship between QS7 and QS1. This means that the organizational support helps the members of staff to be more active on inventory control. In addition, QS6 and QS3 indicate a negative relationship.

This means that reviewing a performance does not have an influence on the competency of staff.

The analyses of these results as per the hypotheses of the study are as follows. As shown in Table 3, the critical factors influencing inventory stock control were tested to check their degree of inter-relatedness with the respondents' biographical details.

Table 3. Chi-square test of the questionnaire statements (QS) with biographical details

Biographical details	QS1	QS2	QS3	QS4	QS5	QS6	QS7	QS8	QS9	QS10
Departments	0.965	.008*	.021*	.004*	0.162	0.179	.008*	0.096	0.104	0.456
Experience	0.070	0.441	0.500	0.863	0.549	0.433	0.507	0.536	0.075	0.545
Qualification	0.411	0.398	0.640	0.414	0.513	0.748	0.375	0.214	0.570	0.552
Chi-square test of the questionnaire statements (QS) with inspection of stock on receipt										
Statements	QS1	QS2	QS3	QS4	QS5	QS6	QS7	QS8	QS9	QS10
Inspection of stock on receipt	0.000*	.007*	.052	.004*	.001*	0.197	.000*	0.123	0.104	.002*

Notes: *. The chi-square statistic is significant at the 95% level ($p < 0.05$).

The chi-square (χ^2) test indicates the associations of the departments with purpose, people, principles, and organizational support at $p = .008^*$, $p = .021^*$, $p = .004^*$, and $p = .008^*$, respectively. The Chi-square (χ^2) test also indicates associations of inspection of stock on receipt with purpose, principles, setting processes, organizational support, and use of technology at $p = .007^*$, $p = .004^*$, $p = .001^*$, $p = .000^*$, and $p = .002^*$, respectively. The remaining variables with p values above 0.05 reflect no significant associations. The study hypotheses were all accepted and their analyses are as follows:

H₁: – A chi-square test was conducted to see if there is a significant relationship between inspection of stock on receipt and dedication of staff. The results indicated a significant relationship of $.000^*$, concluding that the tested variables are positive and strongly related.

H₂: – A chi-square test was conducted to see if there is a significant relationship between setting principles and inspection of stock on receipt. The results indicated a significant relationship of $.000^*$, concluding that the tested variables are positive and strongly related.

Table 4. Component matrix: e-procurement planning for inventory stock control

Questions	Component
	1
The organization makes plans for inventory control	.609
The team set to control inventory is engaged in inventory planning	.836
Inventory suppliers are involved in inventory planning	.798
When making inventory plans, there is clear communication	.813
Only competent individuals are engaged in inventory planning	.602

Notes: Extraction method: principal component analysis. A 1 component extracted

Table 4 indicates that the variables that constituted e-procurement planning for inventory control loaded perfectly along a single component. This implies a degree of consistency for these components that measured what they set out to measure.

8.2. Achievement of the research aims using the 5Ps as a theoretical framework.

The 5Ps model assisted this research to achieve its aims. The purpose of this study was threefold: to identify critical factors influencing e-procurement to control inventory stock; to assess strategies used by e-procurement to improve successful inventory control; and to explore significant relationships between inventory stock control and e-procurement, in the South African municipalities, with specific reference to the KwaZulu-Natal (KZN) Province. The first aim was achieved by identifying that stock inspection, organizational support, staff skills and involvement, and sustainability of the 5Ps attributes (i.e., purpose, principles, processes, people and performance) are the most e-procurement factors influencing control of inventory stock in a South African municipality. The second aim was achieved by exploring that the e-procurement does not use common strategies to control inventory stock. It was further found that the department had a significant relationship with purpose ($p = .008^*$), people ($p = .021^*$), principles ($p = .004^*$) and organizational support ($p = .008^*$). This entails that the hypotheses of the study have been accepted.

Conclusion

The research was conducted to find out whether e-procurement was a promotional tool for the inventory stock control, in the South African municipalities, with specific reference to the KwaZulu-Natal (KZN) Province. However, this study did not cover all South African municipalities, but only one in the KwaZulu-Natal Province. Therefore, the results of the study cannot be generalized to all municipalities. Due to the complexity of the South African municipalities, it was difficult to research every sector in every province. Further studies with larger samples need to include other municipalities of other provinces because this study did not cover those areas. From the results of this study, it is clear that poor

support from organization, poor staff training, and improper clarification of purpose, principles, processes, people and performance are the main critical factors of e-procurement influencing the control of inventory stock in the South African municipality. The results also indicated the correlations between the purpose, principles, people, and organizational support with a department (procurement).

Recommendations

Every year, stores need to draft a comprehensive inventory control plan and must consider all stakeholders involved with inventory logistics (e.g., customers, suppliers, staff and managers from procurement or logistics, internal auditors, risks management team, and members of the executive council). Stores need to consider planning as the most critical factor in achieving best practice of inventory stock control. Advanced planning facilitates physical count requirements to cover preparations for spread sheets used to evaluate inventories at year end. Thus, such planning must involve suppliers in order to balance current inventory requirement with future customer demands.

Stores personnel need thorough training and workshop programs in order to equip them with knowledge of inventory stock control. Comprehensive training and education can help staff with understanding the importance of inventory control and to plan the demand pattern, movement patterns and cycles to build suitable inventory norms for different categories of inventory. Employees also need to be motivated for their good work and can be rewarded in terms of praise, appreciation, thanks, smiles, and opportunities. In this study, educational levels are regarded as an influential factor on inventory stock control. Therefore, this paper recommends improvement on the level of staff training and education.

Durable and non-durable inventories need to be separated and controlled by different personnel from different sections. Stores need to revise its inventory control principles and processes or strategies. This will improve the manner in which the stocks are inspected when they are received from the suppliers. Likewise, deciding on the

team to lead the process of inventory stock control is of utmost importance. This consideration will help Stores division to have official and responsible individuals to control all the records of inventory stock. Members of staff must have limited access of entry.

Only authorized individuals with unique access codes should be allowed to enter inventory storage areas. Moreover, installation of cameras and other useful security systems (i.e., security guards) should be provided as additional staff to the internal audit departments. Stores managers need to review performance and provide a comprehensive report every month end on inventory stock control. The internal audit and risk

management committees should scrutinize each report and make recommendations for improvement.

Proposed municipal conceptual framework

From the findings, it is clear that use of the 5Ps as a theoretical framework assisted this study to propose a new conceptual framework for the municipality to improve e-procurement through inventory stock control.

The proposed municipal conceptual frameworks follow after important recommendations to improve e-procurement in the South African municipality. Moreover, the researchers are encouraged to validate the proposed model.

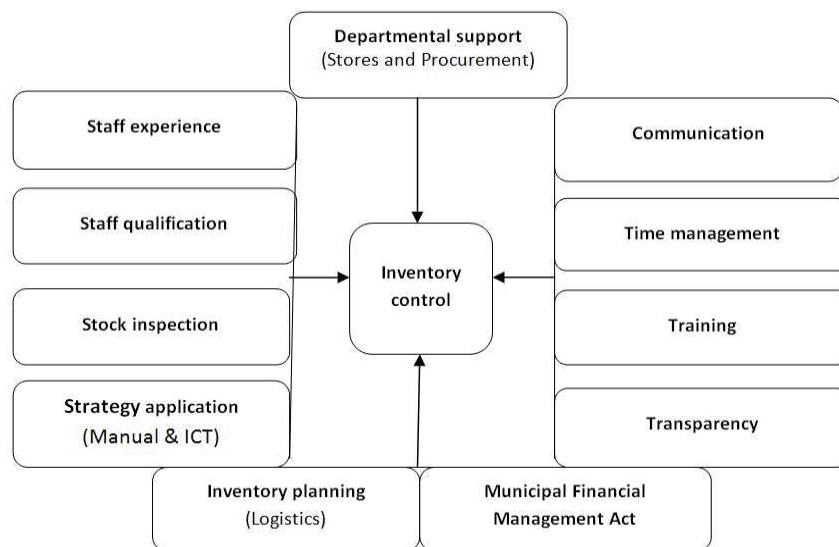


Fig. 4. Proposed municipal conceptual framework to improve e-procurement using inventory stock control

References

1. Intaher, M.A. and Johanna, A.B. (2012). Procurement challenges in the South African public sector, *Journal of transport and supply chain management*, 6(1), pp. 242-255.
2. Erdis, E. (2013). The effect of current public procurement law on duration and cost of construction projects in Turkey, *Journal of civil engineering & management*, 19(1), pp. 121-124.
3. Atkinson, C.L. and Sapat, A.K. (2012). After Katrina: comparisons of post disaster public procurement approaches and outcomes in the New Orleans area, *Journal of public procurement*, 12(3), pp. 360-363.
4. Watermeyer, R.B. (2011). Public procurement regulation in Africa conference: Regulating public procurement in Southern Africa through international and national standards (online). Available at: www.ssinc.co.za/Files/Doc/RBWPapers/T3-18.pdf (accessed 25 December 2014).
5. Abdalkrim, G.M. (2013). The impact of strategic planning activities on private sector organizations performance in Sudan: An empirical research, *International journal of business & management*, 8(10), p. 134.
6. Aldehayyat, J.S. and Anchor, J.R. (2010). Strategic planning implementation and creation of value in the firm, *Strategic change*, 19(3), p. 163.
7. Allal-Cherif, O., Babai, M.Z. (2012). Do electronic marketplaces improve procurement performance?: Supply chain forum, *International journal*, 13(3), p. 40.
8. Allal-Cherif, O. and Maira, S. (2011). Collaboration as an anti-crisis solution: the role of the procurement function, *International journal of physical distribution & logistics management*, 41(9), p. 709.
9. Atkinson, C.L. and Sapat, A.K. (2012). After Katrina: comparisons of post-disaster public procurement approaches and outcomes in the New Orleans area, *Journal of public procurement*, 12(3), pp. 360-363.
10. Audit to build public confidence. (2011). Available at: <http://www.agsa.co.za/Portals/1/Audit%20guidelines/R3%20Reporting%20guide%20final.pdf> (Accessed 22 August 2013).
11. Ballard, R.L. (2010). Methods of inventory monitoring and measurement, *Logistics information management*, 9(3), pp. 16-17.

12. Barbu, A.M. and Lonescu, F.T. (2012). Conceptual model of marketing strategic planning specific to public organizations, *Annals of the University of Oradea, economic sciences series*, 21(2), p. 795.
13. Bijulal, D., Venkateswaran, J. and Hemachandra, N. (2011). Service levels, system cost and stability of production – inventory control systems, *International journal of production research*, 49(23), pp. 7085-7088.
14. Birkinshaw, J. and Heywood, S. (2010). Putting organizational complexity in its place, *McKinsey quarterly*, 3(6), p. 228.
15. Bouzida, Y., Logrippo, L. and Mankovski, S. (2011). Concrete- and abstract-based access control, *International journal of information security*, 10(4), pp. 223-224.
16. Chiang, C. (2013). A note on periodic review inventory models with stochastic supplier's visit intervals and fixed ordering cost, *International journal of production economics*, 146(2), p. 662.
17. Ching-Chow, Y. and Tsu-Ming, Y. (2009). An integrated implementation model of strategic planning, BSC and Hoshin management, *Total quality management & business excellence*, 20(9), p. 991.
18. Dolfsma, W. (2011). Government Failure – Four Types; *Journal of economic issues (M.E. Sharpe Inc.)*, 45(3), pp. 594-595.
19. Gottschalk, P. and Gudmundsen, Y.S. (2010). An empirical study of intelligence strategy implementation, *International journal of police science & management*, 12(1), pp. 55-57.
20. Greenley, E. (2011). Does strategic planning improve company performance? *Long range planning*, 19(2), pp. 101-108.
21. Hailing, D. and Guochao, J. (2011). Limit distribution of inventory level of perishable inventory model, *Mathematical problems in engineering*, 1(1), pp. 1-2.
22. Huefner, R.J. (2011). Internal control weaknesses in local government, *CPA journal (online)*, 87(7), pp. 26-27.
23. Intaher M.A. and Johanna, A.B. (2012). Procurement challenges in the South African public sector, *Journal of transport and supply chain management*, 6(1), pp. 242-255.
24. Jonsson, P. and Mattsson, S.A. (2008). Inventory management practices and their implications on perceived planning performance, *International journal of production research*, 46(7), p. 1788.
25. Keith, F.S. and Rene, G.R. (2008). Public procurement policy: implications for theory and practice, *Journal of public procurement*, 8(3), p. 310.
26. Kok, A.G. and Shang, K.H. (2007). Inspection and replenishment policies for systems with inventory record inaccuracy, *Manufacturing & service operations management*, 9(2), p. 185.
27. Lamanuskas, V. (2012). Responsibility for management: *Problems of management in the 21st century*, 5(4), p. 4.
28. Liberatore, M.J. (2011). Using MRP and EOQ/safety stock for raw materials inventory control: Discussion and case study, *Interfaces*, 9(2), p. 2.
29. Luby, M.J. (2013). The impact of the great recession on the financial management practices of state and local governments: part I, *Journal of public budgeting, accounting & financial management*, 25(1), p. 160.
30. Malhotra, N.K. and Birks, D.F. (2006). *Marketing research an applied approach*. 2nd ed. London: Prentice-Hall, Inc.
31. Minner, S. and Transchel, S. (2010). Periodic review inventory-control for perishable products under service level constraints, *OR Spectrum*, 32(4), pp. 978-980.
32. Mohammaditabar, D., Hassan, G.S. and O'Brien, C. (2012). Inventory control system design by integrating inventory classification and policy selection, *International journal of production economics*, 140(2), p. 655.
33. Mpwanya, M.F. (2005). *Inventory management as determinant for improvement of customer service*. M.Com, University of Pretoria.
34. Naidoo, V. and Wu, T. (2011). Marketing strategy implementation in higher education: A mixed approach for model development and testing, *Journal of marketing management*, 27(11), pp. 1119-1125.
35. Nassar, K.M., Hegab, M. (2006). Developing a complexity measure for project schedules, *Journal of construction engineering & management*, 132(6), p. 555.
36. Nelson, C.M. (2010). Complex job structure and intelligence: a research proposal, *Journal of the Utah academy of sciences, arts & letters*, 87(1), pp. 71-72.
37. Nikbin, D., Saad, N.N. and Ismail, I. (2010). The relationship between internal marketing and implementation of strategic orientations in Malaysian service industry, *International journal of business & management science*, 3(1), p. 17.
38. Nombembe, T. (2012). Only 13 municipalities in the whole country have good books, *Sowetan*, July 1.
39. Pryor, M.G., Anderson, D., Toombs, L.A. and Humphreys, J.H. (2007). Strategic Implementation as a Core Competency, *Journal of management research (09725814)*, 7(1), pp. 6-9.
40. Ramanigopal, C. (2012). Knowledge Management Strategies for Successful Implementation in Aerospace industry, *Advances in management*, 5(12), pp. 19-20.
41. Schatteman, A. (2010). The state of Ontario's municipal performance reports: A critical analysis, *Canadian public administration*, 53(4), p. 531.
42. Singh, S.R. and Kumar, V. (2010). Two Storage inventory model for deteriorating items with exponential demand and shortages, *International transactions in applied sciences*, 2(4), p. 771.
43. Singh, T., Sahu, S.K. and Nayak, A.K. (2012). An EOQ model for a deteriorating item with time dependent quadratic demand and weibull distribution deterioration under permissible delay in payment, *Advances in theoretical & applied mathematics*, 7(3), pp. 295-297.

44. Chain management policy. (2005). Available at: <http://www.mbombela.gov.za/supply%20chain%20management.pdf> (Accessed 22 March 2013).
45. Umakanta, M. and Chaitanya, K.T. (2012). An EOQ model for time dependent Weibull deterioration with linear demand and shortages, *Scientific journal of logistics*, 8(2), pp. 124-130.
46. Wei, Y. (2012). Optimization and optimality of a joint pricing and inventory control policy in periodic review systems with lost sales, *OR spectrum*, 34(1), pp. 245-250.
47. Wei, Y., Wang, H. and Qi, C. (2013). On the stability and bullwhip effect of a production and inventory control system, *International journal of production research*, 51(1), pp. 155-161.
48. Welman, C., Kruger, F. and Mitchell, B. (2011). *Research methodology*. Cape Town: Oxford University Press-South Africa.
49. Watermeyer, R.B. (2011). Public procurement regulation in Africa conference: Regulating public procurement in Southern Africa through international and national standards (online). Available at: <http://www.jtscm.co.za/index.php/jtscm/article/viewFile/63/59> (Accessed 25 January 2014).
50. Xiaoya, L., Marler, J. and Zhiyu, C. (2012). Strategic human resource management in China: East meets West, *Academy of management perspectives*, 26(2), p. 55.