UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Gordon Institute of Business Science
University of Pretoria

Factors affecting the adoption of e-procurement technologies from the supplier perspective

Luvuyo Mkululi Mgidlana

11363828

A research proposal submitted to the Gordon Institute of Business Science, University of Pretoria in preliminary fulfilment of the requirement for the degree of Masters of Business Administration

11 November 2013

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

ABSTRACT

Quesada, Gonzalez, Mueller & Mueller (2010) have identified that organisations spend at least one-third of their overall budget on procurement of products and services. Hence the importance of reducing procurement costs through an efficient supply chain should be a priority for any senior manager. E-procurement is one of the components that can assist management in streamlining the operations resulting in an efficient supply chain process.

The usage of qualitative research for this study ensured that appropriate answers were identified to address the research question and a clear understanding was obtained to establish the factors that affect the adoption of e-procurement technologies. The scope of the research was focused on the suppliers and manufactures of plumbing material in South Africa.

The aim of the study was to establish the factors that influence organisation in adopting e-procurement technologies. The data reflected that e-procurement adoption improves organisation's productivity, ability to better control costs resulting in an efficient and effective supply chain process. This is only possible with the support of senior management, end-user buy-in and allocation of financial resources. The three major findings identified were that e-procurement adoption is driven by internal needs, reduces labour costs and improves customer relations. Possible Future research should examine the influence of other factors such as competitiveness, customer service and organisation size.

KEY WORDS

Supply chain management, information technology, e-procurement, procurement, collaboration

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Luvuyo Mkululi Mgidlana **Date**

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

ACKNOWLEDGEMENT

I acknowledge the following people for the value contribution.

Firstly, I would like to express my sincerest appreciation to Dr Dinesh Kumar, my supervisor, for being supportive and accommodative throughout this process, giving me space to be able to work at my own pace.

To each and every organisation that opened its doors and individuals that I interviewed, thank you for your enthusiasm to contribute to this research hopefully this will add value to the plumbing industry in South Africa.

Lastly, I would like to thank God for allowing me to be mentored and surrounded by man such as Seaweed McFarlane and Rod Fehrsen. Thank you Seaweed for the opportunities and the support you have given me for the past six years through my career and through this process. I am not able to find appropriate word to express my gratitude. Rod I will be forever grateful for the time you have spent with me in the past two year without expecting anything in return. Thank you so much for your time as I am fully aware how precious it is.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

DEDICATION

To my supportive wife Thabiso, thank you for being a father and a mother throughout this whole process. My daughter Olwethu and my son Kuhle Mange, my perspective in life change from the day you guys were born, thank you for your love; I have nothing but love for you.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Table of Contents

Abstract ii
Key words ii
Declaration iii
Acknowledgement iv
Dedication v

1. Chapter 1: Introduction 1
1.1 Overview 1
1.2 Purpose of the research 2
1.3 Significance of the report 2
1.4 Structure of the report 5

2. Chapter 2: Literature Review 6
2.1 Impact on supply chain management 6
2.2 Information Technology 7
2.2.1 Supply chain information technologies 9
2.2.2 Transaction cost economics and number of suppliers 10
2.3 E-procurement 11
2.4 Factors impacting the use of e-procurement 15
2.4.1 Influence by buyers 15
2.4.2 Improvement of operations 17
2.4.3 Internal support 18
2.5 Plumbing industry 20
2.6 Theoretical Model 21
2.6.1 The technology acceptance model (TAM) 21
2.7 Summary 23

3. Chapter 3: Definning the problem 24

4. Chapter 4: Research methodology 25
4.1 Research methodology and design 25
4.2 Target population 26
4.3 Sampling frame 27
4.4 Sample method 28

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

4.5 Sample size 29
4.6 Data collection 30
4.7 Data analysis 31
4.8 Limitations 32

5. Chapter 5: Results 33
5.1 Sampling description 33
5.2 Content analysis 34
5.3 Influence by customers 34
5.3.1 Influenced by an internal need 35
5.3.2 Influenced by customers 36
5.3.3 Influenced by perceived volume increase 37
5.3.4 Summary 38
5.4 Improvement of internal operation 39
5.4.1 Time saving and speed of delivery 39
5.4.2 Reduce error rate and improve data integrity 41
5.4.3 Productivity and efficiency of internal operations 42
5.4.4 Reduction in labour costs 43
5.4.5 Decrease the exposure to fraudulent orders 44
5.4.6 Access to accurate information & improvement to decusion making 45
5.4.7 Improve customer relations 46
5.4.8 Increase sales 47
5.4.9 Summary 48
5.5 Internal support 49
5.5.1 Technical support 49
5.5.2 Senior management and end-user support 50
5.5.3 Availability of finacial resources 51
5.5.4 Summary 51
5.6 Conclusion 51

6. Chapter 6: Discussion of results 52
6.1 Proposition 1 52
6.1.1 Influence by an internal need 52
6.1.2 Influence by an customers 53
6.1.3 Influence by volume increase 53
6.1.4 Summary 54

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.2 Proposition 2 54
6.2.1 Time savings and speed of delivery 54
6.2.2 Reduce error rate and improve data integrity 55
6.2.3 Productivity and efficiency of internal operations 56
6.2.4 Reduction in labour costs 56
6.2.5 Decrease the exposure to fraudulent orders 57
6.2.6 Access to accurate information & improvement to decision making 58
6.2.7 Improve customer relations 59
6.2.8 Increase sales 60
6.2.9 Summary 61
6.3 Proposition 3 61
6.3.1 Technical support 61
6.3.2 Senior management and end-user support 62
6.3.3 Availability of finacial resources 63
6.3.4 Summary 63

7. Conclusion 64
7.1 Introduction 64
7.2 Findings Summary 65
7.2.1 Influence by customers 65
7.2.2 Improvement of internal operations 66
7.2.3 Internal support 67
7.3 Recommendations 68
7.4 Future research 69
7.5 Conclusion 69

8. References 70

9. Appendix A: Questions for an interview 76

10. Appendix B: Consent form 78

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

List of Figures

Figure 1**:** A Process for exploiting information technology for collaboration advantage……8

Figure 2: Technological acceptance model……..…22

Figure 3: Data analysis diagram……..31

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

List of Tables

Table 1: Drivers influencing the adoption of inter-organisational Information systems……..……7

Table 2: Perceived benefits of adopting e-procurement technologies……12

Table 3: Perceived barriers/cost of adopting e-procurement technologies……14

Table 4: Plumbing product category purchases from July 2012 to June 2013: Percentage split (Leading plumbing merchant in South Africa)…….28

Table 5: Companies selected and the product categories……...29

Table 6: Organisations selected for interviews and job title of the individuals……...33

Table 7: Influence factors on the adoption of e-procurement…….....34

Table 8: Improvements in internal operations due to e-procurement adoption…….39

Table 9: Internal support factors in the adoption of e-procurement solution……..49

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

List of Abbreviations

B2B	Business to business
CD	Compact disc
EDI	Electronic data integration
E-procurement	Electronic procurement
FMCG	Fast moving consumer goods
PVC	Polyvinyl chloride pipe
ROI	Return on investments
TAM	Technology acceptance model

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

1. CHAPTER 1 - INTRODUCTION

1.1 OVERVIEW

An aligned supply chain strategy identifies that integrated business processes and information technology processes create value for the organisation customers. Electronic data integration (EDI) not only creates value for the buyer's but is able to have added benefits for the suppliers of the organisation (Vickery, Jayaram, Droge & Calantone, 2003). Information technology has the ability to reduce production and coordination costs within the organisation and through its partners (Dedrick, Xin Xu & Xiaoguo Zhu, 2008). Vickery, Droge, Seita & Sambamurthy (2010) argues that information technology is a critical element in ensuring organisation's performance.

Previous research has also established that information technology has the ability to reduce production and coordination costs within the organisation and externally (Javanmardi, Khabushani & Abdi, 2012), (Tai, Ho, & Wu, 2010), and (Aboelmaged, 2010). Information technology has the ability to assist organisation to cooperate with each other resulting in linkage of their internal processes in the supply chain (Gilaninia, Mousavian, Tayebi, Panah, Ashouri, Touhidi, Nobahar, Azizi, & Seighalani, 2011).

Quesada *et al.* (2010) have further illustrated that the utilisation of information technology systems to support the supply chain management increases the efficiency of the supply chain and improves the profitability of the organisation. Building a strong supply chain is essential for business success. Research has shown that successful companies that build agile, adaptable and aligned supply chains get ahead of their competitors (Lee, 2004), (Devaraj, Vaidyanathan & Mishra 2012) and (Vickery *et al*., 2003).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

1.2 PURPOSE OF THE RESEARCH

The focus of this work is on electronic procurement (e-procurement) that refers to different types of purchasing functions. The majority of the organisation's funds are spent on the procurement of materials and service to support the organisation activities than on all expenditure activities consolidated (Aboelmaged, 2010). To support the studies on e-procurement research that has been done, Quesada *et al.* (2010) have identified that organisation spend at least one-third of their overall budget on procurement of products and services.

The research focused on the supplier's/seller's perspective, as extensive research has been done to establish the benefits that the buyers obtain through the e-procurement process (Tai *et al*., 2010). Panda & Sahu (2012) have indicated that suppliers as the most important stakeholders in ensuring successful implementation of an e-procurement solution. Supplier operational improvement through the implementation of e-procurement is supported by Tai *et al*. (2010) stating that not only the buying organisation's operational processes improve but also the supplier's processes improve resulting in a more efficient order fulfillment process.

The plumbing industry has been a late adopter of business technology advances (Bas, 1999). The challenges faced by plumbing industry has been the transparency and the exchange of data between organisations to track product sold, reduction in inventory or the return of stock to the manufacture (Bas, 1999).

1.3 SIGNIFICANCE OF THE REPORT

Tai *et al*. (2010) states that buyers who adopt the e-procurement system when transacting with suppliers are able to reduce transaction costs, develop efficient internal procurement process and increase collaboration with suppliers. This is also supported by the research done in some of the Australian organisation that e-procurement drivers include the reduction of product costs, improvement of visibility of customer demands, reduction of administration cost, improvement of inventory

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

management, enhancement of decision making and results in an efficient procurement cycle (Piotrowicz & Irani, 2010). Further benefits from the buyers perspective through the sharing of information includes effective forecasting, better control of inventory which has a positive impact on the cash flow (Tai *et al*., 2010).

Whilst research has shown benefits in implementing information technology solutions, the difficulties that most business have is to quantify benefits by using traditional measurement methods such as return on investment (ROI) (Piotrowicz & Irani, 2010). The lack of commonly used benchmark tools to compare e-procurement implementation has been one of the major challenges in convincing management that the benefits of implementing e-procurement technologies outweigh the costs (Piotrowicz & Irani, 2010). Smart (2009) states that organisations have not adequately validated the implementation of e-business projects and surveys that have been conducted reflect that the adapter's main justification was the reduction of operational costs.

The difficulty in measuring the benefits of e-procurement investment is also expressed by Tanner, Woelfe, Scubert & Quade (2008). In their study, they identified that some organisation had challenges in evaluating the benefit of information technology solutions. Rajkumar (2001) identifies that there are less visible cost in implementing e-procurement such as consultants, integration, catalogues and search engines, transaction costs as well as user training that makes it difficult to measure the benefits or the costs. Piotrowicz & Irani (2010) have identified that some organisation have attempted to measure tangible benefits at the operational level such as process time, cost or number of decision points, but have made observation or assumption concerning strategic benefits.

Aboelmaged (2010) views procurement as a strategic function of any organisation in the value chain as it represents the largest expense item within the cost structure of an organisation. This explains why organisation from the buyer's perspective encourages their supplier to implement e-procurement as it eliminates wasted time on non-value-adding activities such as data entry, handling errors in ordering, costing and invoicing (Aboelmaged, 2010). Devaraj *et al*. (2012) also argues that e-procurement or the

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

automation of the organisation procurement process has a positive impact on the improvement of business operations as well as the reduction in operational expenses.

Limited research has been conducted on the benefits derived by suppliers from supply chain management systems specifically e-procurement and the mechanism that facilitates them to realize the benefits (Subramani, 2004). Due to the fact that suppliers incur set up cost as well as related cost in implementing e-procurement it is imperative to established the derived benefits. Angels & Nath (2007) has also conducted a study on the success and challenging factors that affects the implementation of e-procurement from the buyer's perspective and has indicated that future research is warranted from the supplier's perspective.

Whilst EDI was the most common method of e-procurement in the early 2000, the implementation and maintenance costs could only be absorbed by most large profitable organisation. With the current status of affordable bandwidth and affordable internet tools, more organisations are able to enter the e-procurement space (Tai *et a*l., 2010).

This study will examine the factors affecting the adoption and non-adoptions of e-procurement systems by suppliers and manufactures in the plumbing industry. Research that has been previously done on this subject highlights that e-technologies strongly influence future supply chain strategies as a result investigation of e-procurement factors is an imperative research direction (Purchase & Dooley, 2010).

Miodonski (2000) has identified that the adoption of e-procurement technologies have been very slow in the plumbing industry. As a result of implementation failures the industry has been reluctant in rolling-out integrated automation technologies such as EDI. This is supported by McNally (2013) that the plumbing manufactures should learn from the electronic manufactures concerning the adoption of e-procurement technologies in improving the supply chain.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

1.4 STRUCTURE OF THE REPORT

Chapter 1: This chapter provides the overview, purpose, significance and structure of the report.

Chapter 2: Through a literature review, this chapter outlines the relevance of e-procurement to business. It highlights the importance of information technology systems in influencing the organisation's supply chain management. The chapter also establishes the importance of procurement to business and the avenues such as e-procurement that has been taken by organisation to reduce purchasing costs. The focus of this report is on the factors that suppliers and manufactures should consider prior making a decision to adopt e-procurement technologies.

Chapter 3: Defines the problem and highlights the factors that affect the adoption of e-procurement technologies. This chapter also outlines a number of propositions to be tested.

Chapter 4: Provides an outline of the research methodology, which uses qualitative research method to test the propositions. The chapter also highlights the population, the sample size and sampling method, and the details of how the data was collected and the process of data analysis. The limitations of the research have also been specified.

Chapter5: Outlines the results obtained from the semi-structured interviews conducted and the analysis done on the data obtained.

Chapter 6: Outlines the findings and related discussions from the research.

Chapter 7: Highlights the main findings of the research, including recommendations, future research and managerial implications.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2. CHAPTER 2 – LITERATURE REVIEW

2.1 IMPACT ON SUPPLY CHAIN MANAGEMENT

Supply chain management has been defined as the art and science of creating and accentuating synergistic relationships among the trading partners in supply and distribution channels with the common shared objective of delivering products and services to the “right customer,” in the “right quantity”, and at the “right time” (Vakharia, 2002, p. 495). Quesada *et al.* (2010) support this definition by stating that supply chain management incorporate all the methods utilised to efficiently integrate the supply-side participants of an organisation’s value chain, as a result products and services can be delivered to the customer in the right quantities, to the right location, at the right time, and optimal cost.

The success of the supply chain depends on the flow and sharing of information from one organisation/unit to another (Devaraj *et al*., 2012). An e-procurement process requires regular transactions on a long-term basis through negotiated contracts with selected suppliers, hence the flow of accurate information between the trading partners is crucial to achieve efficiencies (Devaraj *et al.*, 2012). This is supported by Percy & Giunipero (2008) that effective supply chain management depends extensively on the integration and coordination of functions across the organisation and between trading entities.

Percy & Giunipero (2008) further state that organisations depend on internet-based technologies to achieve integration. Organisations that fail to adopt integrative e-procurement technologies might find themselves competitively disadvantaged (Percy & Giunipero, 2008). Devaraj *et al*. (2012) also states that inter and intra-organisational collaboration has reflected a strong direct impact on the organisation profitability.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2.2 INFORMATION TECHNOLOGY

The integration of information system between organisations allows for an increase in the free flow of relevant information that results in better decision making from both the buyer and the supplier (Vickery *et al*., 2003). Research that has been done in this area recognizes that information technology integration improves customer service and decreases operational cost between buyer and supplier. The research further stipulates that EDI is a driving force for a competitive supply chain management strategy (Vickery *et al*., 2003). Archer, Wang & Kang (2008) illustrate on this point by identifying drivers and inhibitors in adopting inter-organisational information systems. They have identified drivers as the following;

TABLE 1: Drivers influencing the adoption of inter-organisational information systems

Drivers	Areas Impacted
Increase Efficiency	Transaction cost reductions, information distortion reduction.
Increase Effectiveness	Improved information quality, improved supplier relationships, and new organisational capabilities.
Competitive Positioning	
External Pressure	

They have also identified inhibitors as the following;

- Operations and infrastructure (system incompatibilities)
- Unavailability of financial resources
- Unaligned strategies
- Unwillingness in sharing of appropriate information
- Support from senior management and end-users

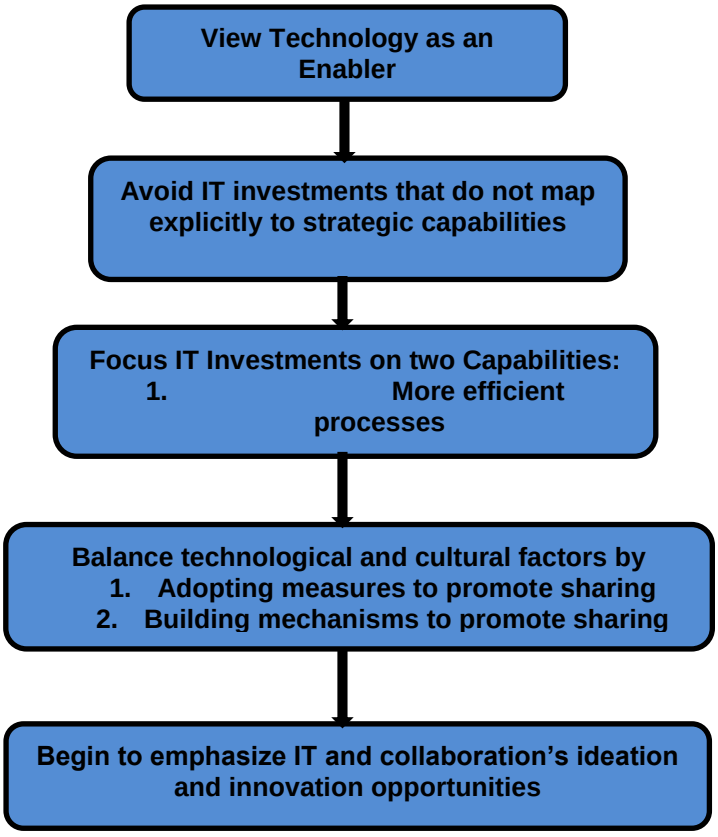
Vickery *et al.* (2003) state that information technology integration within the supply chain results in performance benefits. The performance benefits are a result of

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

reduction is business costs due to the elimination of operational duplication of resources (Sanders, 2005). Research literature has identified that information technology integration positively impact the collaboration between buyers and suppliers resulting in better inventory management, demand forecasting, order management and customer service (Sanders, 2005). Piotrowicz & Irani (2010) has identified that information system benefits must be able to add value in the following business areas; financial, growth and learning, customer and business processes.

Fawcett, Wallin, Allred, Fawcett, & Magnan (2011) demonstrate five guidelines to exploiting information technology investment for a collaboration advantage.

Figure 1: A Process for Exploiting Information Technology for Collaboration Advantage



Source: Fawcett et al. (2011)

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2.2.1 SUPPLY CHAIN INFORMATION TECHNOLOGIES

Supply chain information technologies have the ability to facilitate the transmission and flow of information across the organisation to connect processes and activities (Vickery *et al*., 2010). Previous research that has been conducted has identified that supply chain information technologies can decrease coordination costs and transaction risks (Sanders, 2005).

Study conducted by Vickery *et al*. (2010) supports the fact that technologies such as "computerized products systems" help to coordinate and integrate activities within manufacturing, "integrated information system" play a role in facilitating interaction across functional areas and last that "electronic data integration systems" support and promote collaboration between organisations and external partners e.g. suppliers. This study will examine the reasons that suppliers adopt or are not able to adopt EDI systems and technologies.

Supply chain information technologies have the ability to create exit barriers for the buyer favouring the supplier as relationship termination might involve foregoing existing benefits (Subramani, 2004). As a result, supply chain information technologies such as EDI are capable of enhancing the buyer's dependence on the supplier and increase the supplier's bargaining power in the relationship (Subramani, 2004).

Supply chain information technologies may also give rise to operational benefits from the supplier perspective such as faster invoicing and payments, more-efficient inventory management and the automation and rationalizing of business processes (Subramani, 2004).

Observation by Subramani (2004) is that buyers favour suppliers adopting supply chain management system, resulting in these suppliers likely to derive costs efficiencies from higher sales volumes. This is supported by the observation raised by

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Mukhopadhyay and Kekre (2002) that suppliers adopting electronic data integration systems initiated by buyer organisation benefit from higher sales volumes.

To emphasize on this matter further, a study conducted by Subramani (2004) reflected that supplier benefits excludes price increases as the buyer negotiated price reductions in supply contracts as a result the benefits were limited to increase sales volumes, process improvements and the creation of new operational processes.

2.2.2 TRANSACTION COST ECONOMICS AND NUMBER OF SUPPLIERS

Transaction cost economics states that organisation encounter the challenge of opportunism when they are in a situation bargaining with a small number of other organisation (Dedrick *et al.*, 2010). Hence, then having more suppliers reduces this risk and affords the organisation the ability to negotiate better procurement deals as the buyer is less dependent on any particular supplier (Dedrick *et al*., 2008). Dedrick *et al*. (2008) states that the number of suppliers chosen by an organisation encompasses an optimal balance among the following key transaction factors: fit, coordination costs, and risk of opportunism.

Information technology has the potential of reducing coordination costs as procurement processes are standardized and automated, thus reducing the cost of working with more suppliers (Dedrick *et al*., 2008). This mostly benefits the buying organisation especially for commodity items such as copper pipes; polyvinyl chloride pipe in the plumbing industry as with a greater number of suppliers the buyer has the bargaining power. Information technology allows organisation to reduce the number of suppliers and focus on low-cost suppliers of standard goods and consolidated their purchases to obtain volume discounts (Dedrick *et al.*, 2008).

Information technology also has the potential of reducing the number of suppliers especially when dealing with customized products (Dedrick *et al.*, 2008). Information technology assists the buying organisation to work closely with fewer suppliers, reducing search and coordination cost without taking on additional transaction risks

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

(Dedrick *et al*., 2008). This might have a negative impact on suppliers that do not have the appropriate technology fit as they could be discarded by the buying organisation.

2.3 E-PROCUREMENT

The characteristics of an appropriate procurement processes can be classified as accurate and economical. Accuracy is about the procurement process ability to acquire the correct item and economical is about getting it at the best possible price (Nissen, 2006). Further, the majority of the organisation's funds are spent on the procurement of materials and service to support the organisation activities than on all expenditure activities consolidated (Aboelmaged, 2010).

Quesada *et al.* (2010) emphasize on the importance of e-procurement studies due to that fact that procurement is one of the most critical functions of the supply chain. To support the studies on e-procurement research that has been done, Quesada *et al.* (2010) have identified that organisations spend at least one-third of their overall budget on procurement of products and services. Hence, it is imperative for any organisation to ensure that efficiencies are built within the procurement process to ensure competitive advantage and profitability.

Traditionally the procurement process has included various communication forms such as telephones, fax, mail, electronic data integration and in many organisations currently being emails as well as the internet (Aboelmaged, 2010). The web-based procurement technologies have the potential of improving efficiencies within the procurement process through the transforming of the traditional processes to e-procurement (Aboelmaged, 2010). This is supported by Abu-Elsamen, Chakraborty & Warren (2010) that e-procurement technologies have been used by organisation in the reduction of procurement costs, efficient management of inventory to the desired levels. These benefits have allowed organisation to utilise the e-procurement technologies to transform the procurement process (Abu-Elsamen *et. al.,* 2010).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

For a summary of perceived benefits found in literature and their references, see table 2 below.

TABLE 2: – Perceived benefits of adopting e-procurement technologies

Benefits	Reference
Reduce transaction costs	Tai *et al*. (2010); Aboelmaged (2010); Sanders (2005); Vickery *et al.* (2010); Abu-Elsamen et al. (2010)
Develop efficient process	Tai *et al*. (2010); Piotrowicz & Irani (2010); Aboelmaged (2010); Sanders (2005); Smart (2009); Dooley & Purchase (2006)
Increase collaboration	Tai *et al.* (2010); Smart (2009)
Improve inventory management	Piotrowicz & Irani (2010); Tai *et al.* (2010); Sanders (2005); Abu-Elsamen et al. (2010)
Enhance decision making	Piotrowicz & Irani (2010)
Information sharing	Devaraj et al. (2012)
Improve accuracy of data	Piotrowicz & Irani (2010)
Effective forecasting	Tai *et al.* (2010); Sanders (2005)
Improves market intelligence	Abu-Elsamen et al. (2010)
Reduction in labour cost	Piotrowicz & Irani (2010)
Eliminate maverick buying	Sitar (2011); Brandon-Jones & Carey (2011); Abu-Elsamen et al. (2010)
Improve cash flow	Tai *et al.* (2010)

Devaraj *et al.* (2012) also support Lee (2004) that e-procurement application have given organisation capabilities to enhance their flexibility allowing them to respond efficiently to the dynamic customer requirements, intense global competition and ever-changing technological advancements. To elaborate on this Devaraj *et al.* (2012) also indicates that the implementation of e-procurement technologies allows delivery schedules to be digitalized and to share extensive information with suppliers, which results to improved flexibility and better control of the products supplied. Smart (2009)

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

argues that e-procurement tools are designed to automate the buying cycle, optimizing spend, improves processes and workflow, and has the potential of strengthening collaboration and integration within the supply chain.

Smart (2009) has indicated that there are also disadvantages or barriers in implementing e-procurement technologies such as technological immaturity, challenges experienced in implementing changes, potential conflict with suppliers, implementation costs as well as the inability of smaller enterprise to experience the benefit.

For a summary of perceived barriers/cost found in literature and their references, see table 3.

Aboelmaged (2010, p. 393) noted that through various literature that has been evaluated e-procurement has been defined in many different ways. Listed below are the various definitions of e-procurement published in different literatures:

- Internet solutions that facilitate corporate purchasing
- A series of steps – from the formulation of the purchasing corporate strategy to the actual implementation of an Internet-based purchasing system
- Automating the whole purchasing process and making order and requisition information available along the entire supply chain
- The creation of private, web-based procurement markets that automate communications, transactions and collaboration between supply chain partners
- Various internet-based business-to-business (B2B) commerce (trading or buying-and-selling) systems, which are located at the buyer, the supplier or the third party
- The integration, management, automation, optimisation and enablement of an organisation's procurement process, using electronic tools and technologies, and web-based applications
- The use of information technologies to facilitate B2B purchase transactions for materials and services

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

TABLE 3 – Perceived barriers/cost of adopting e-procurement technologies

Barriers/cost	Reference
Inability to measure the benefits	Piotrowicz & Irani (2010); Tanner *et al.* (2008); Rajkumar (2001)
Implementation costs	Smart (2009); Mahalik (2012); Sitar (2011)
Technology immaturity	Smart (2009); Sitar (2011)
Lack of financial resources	Dooley & Purchase (2006)
Implementation challenges	Smart (2009)
Conflict with suppliers/customers	Smart (2009)
Lack of support by internal users	Panda & Sahu (2012); Brandon-Jones & Carey (2011); Sitar (2011)
Inability to address strategic issues	Piotrowicz & Irani (2010)
Security	Abu-Elsamen *et al.* (2010)
Lack of support by management	Panda & Sahu (2012); Teo *et al.* (2009); Sitar (2011)

For the purpose of this study the following definition of e-procurement will be considered that “E-procurement includes web technology-based purchasing solutions aimed at simplifying commercial transactions within and between organisation and information technology solutions for ordering, logistics and handling systems as well as for payment systems” (Sitar, 2011, p. 291).

This definition is supported by Dooley & Purchase (2006, p. 30) that e-procurement is an electronic tendering, or auctioning and procurement of products and services over the internet. Quesada *et al.* (2010, p. 518) view is that the emphasis on internet only concerning e-procurement technologies might result in a narrow understanding of its benefits.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2.4 FACTORS IMPACTING THE USE OF E-PROCUREMENT

E-procurement transformation has ensured that the benefit is not in favour of the buyer by means of prices being dropped by the supplier or decreasing their trading margins but to achieve savings. The savings can be realized by both buyers and suppliers through appropriate management of material and administration costs.

Organisation that have adopted e-procurement experience the following benefits; decrease the time and cost required to generate a purchase order, placing of orders, selection of correct suppliers, tracking shipment status, management of payments and follow up with suppliers (Aboelmaged, 2010).

Although research as stated above is clear on the benefits that exist with the implementation of an e-procurement platform the focus of this study will be on the factors that influence the use of e-procurement systems. The factors that will be evaluated will be from the supplier's perspective and originating both internally within and externally from the organisation. Listed below are the factors through the analysis of the literature that have influence in the adoption or non-adoption of the e-procurement system:

1. Influence by buyers
2. Improvement of operations
3. Internal support

2.4.1 INFLUENCE BY BUYERS

Dooley & Purchase (2006) state that e-procurement should be viewed by both parties (buyer and supplier) as a tool to assist in the development of a relationship and the alignment of strategies for the future. For improvement to be prevalent within the supply chain there has to be a closer relationship between the buyer and the supplier (Purchase & Dooley, 2010). This also applies to e-procurement systems, with closer relationships influencing the use of new technologies (Purchase & Dooley, 2010).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Suppliers have been indicated as the most important stakeholders in ensuring success implementation of an e-procurement system (Panda & Sahu, 2012). Their involvement is from the initial stages as well as giving feedback on the performance of the system and suggesting improvements (Panda & Sahu, 2012). Smart (2009) also states that the suppliers play a critical role in ensuring that their customers e-procurement solution is successfully adopted.

Due to the fact that buyers benefit from the implementation of e-procurement through improvement of management information across all areas of the purchasing function, have a greater management influence and control over the purchasing process (Sitar, 2011). Dooley & Purchase (2006) state that if suppliers are unwilling to implement e-procurement buyers can either limit the uptake of e-procurement within their business or source new suppliers who are willing to transact electronically.

Buyers also have a better opportunity to manage the entire supply base and eliminate "maverick" spending (Sitar, 2011). Brandon-Jones & Carey (2011) define "maverick" buying as buying outside the established procedures or contracts that do not optimise value for money. Abu-Elsamen *et al.* (2010) also states that e-procurement allows organisation to leverage the bargaining power in establishing contracts with their preferred suppliers, reducing "maverick" buying from non-contracted suppliers.

With such overwhelming evidence (*see Table 2*) concerning the benefits that buyers obtain through the implementation of the e-procurement system, it would be correct to assume that they are able to influence suppliers too in implementing e-procurement technologies.

To further support the influence of the buyers in ensuring that suppliers adopt e-procurement system, Tai *et al*. (2010) indicates that e-procurement allows the buying organisation to reduce transaction costs, improve internal procurement process efficiency and increase collaboration with suppliers. This is supported by Abu-Elsamen *et al*. (2010) that the adoption of e-procurement technologies improves market intelligence, reduce operational and inventory costs, capability of substantially reducing purchasing transaction costs.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2.4.2 IMPROVEMENT OF OPERATIONS

E-procurement has been associated with improvements through reduction in cost prices, efficiency benefits through reduced work content, and cost/efficiency benefits through reduced time taken to undertake the tasks (Purchase & Dooley, 2010). These benefits/improvements in using e-procurement system are experienced by both the buyer and the supplier validating that the supplier is an important factor in ensuring that these savings become a reality (Purchase & Dooley, 2010). Mahalik (2012) study reveals that e-procurement improves operational processes at the same time allows management to better manage its operations.

Even though the e-procurement system is costlier and requires significant investment initially, it improves the overall operational effectiveness (Mahalik, 2012). This is also supported by the study done by Abu-Elsamen *et al.* (2010) that e-procurement technologies have the potential of reducing purchasing transaction costs as a result of simplifying the purchase process and the reduction in purchasing cycle time, which increases flexibility at the same time, improves the efficiency of the operations. Dooley & Purchase (2006) elaborates on the improvements of operations as purchasing professionals are able to spend less time on administration tasks and concentrate more on strategic issues.

Further research support the fact that e-procurement improves organisational efficiency resulting in profitability as well as reduction in lead time and cost of procurement and enhance transparency (Panda & Sahu, 2012). Panda & Sahu (2012) further states that through the implementation of an e-procurement system non-value adding processes are purged and business processes are substantially re-engineered to ensure efficiency.

Tai *et al* (2010) views were that operations improve through the implementation of e-procurement and not only the buying organisation's operational processes improve but also the supplier's processes improve resulting in a more efficient order fulfillment process. This is only possible from the supplier point of view if they are able to

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

recognize the order, so that the order demand patterns are more transparent (Tai *et al.*, 2010).

Operational improvements are also evident in the labour costs and increase in productivity as e-procurement technologies are capable to handle increase volumes in order processing without increasing the work force (Piotrowicz & Irani 2010). Due to the standardization of business process that e-procurement technologies introduces to the organisation benchmarking, comparison of processes and performance between various regions or countries within the organisation is made possible (Piotrowicz & Irani 2010). These operational benefits allow organisation the ability to transfer staff from one region or country to another as a result of standardized business processes. The automation of the purchasing function has the potential of reducing the labour force in the buying department resulting in reduction in purchasing cost and an improvement in profits for the organisation (Piotrowicz & Irani 2010).

E-procurement technologies also improve the accuracy of data due to the single point of data entry into the system. The exchange of data between the two entities is also improved, as document transfer is quicker and fewer errors are made at the capturing stage (Piotrowicz & Irani 2010).

Although operational benefits have been identified in the implementation of e-procurement technologies reservations have been noted by Piotrowicz & Irani (2010) that these benefits dominate the operational functions of the business and fail to address the strategic direction of the organisation.

2.4.3 INTERNAL SUPPORT

Internal aspects that affect e-procurement within an organisation are technical capabilities of the internal sales personnel (order takers), magnitude of investment in training and the ability of the information technology division with top management in selecting the appropriate software and executive management support (Purchase & Dooley, 2010). Abu-Elsamen *et al.* (2010) identifies absence of technological

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

infrastructure required to support business operations, information security as well as privacy of exchange as one of the major reason why organisation do not adopt e-procurement.

E-procurement implementation costs required support from executive management as company resources have to be made available for the initiative to be successful. The adoption of the e-procurement system strongly depend on the organisation's commitment specifically senior management not neglecting support for the relationships between information flow process quality, logistics fulfillment quality processes, and e-procurement satisfaction performance (Panda & Sahu, 2012). The availability of financial resources as well as managerial skill steers organisation to adopt e-procurement technologies (Abu-Elsamen *et. al*., 2010).

Further commitment to ensure success of the implementation of the e-procurement system is required from the internal users (Panda & Sahu, 2012). It is imperative for organisation that are planning to implement an e-procurement system to properly consider the expectations and capabilities of their users since level of compliance is influenced by the user's perceptions of the system (Panda & Sahu, 2012). Brandon-Jones & Carey (2011) also state that cost saving expectations do not materialize for many organisations due to non-compliance by end-users. It is therefore critical for end-users to support the adoption of e-procurement implementation for financial benefits to be achieved.

To emphasize on the importance of top management support, Panda & Sahu (2012) states that push from senior management has been found to be the most important factor for successful implementation of e-procurement. Senior management role is to ensure that necessary resources are committed to the project to guarantee success.

This is consisted with Teo, Lin, & Lai (2009) study that the adoption of e-procurement has to be done through a top down approach. Top management first has to realize in what way technology will improve organisational performance. Only then will they allocate appropriate resources. Due to the top down approach it is easier for employees to embrace the technological change because it is driven from the top.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Dooley & Purchase (2006) also argues that staffing levels, training in new technologies, encouragement from management, sufficient financial resources and adequate budget allocation are the internal factors that are vital for an organisation to adopt e-procurement technologies.

Although there are other barriers in implementing e-procurement such as inadequate technical and technological infrastructure, implementation costs etc. the major barrier are the people within the organisation (Sitar, 2011). This notion is supported by Abu-Elsamen *et al.* (2010) that inadequate in-house skills is one of the main barriers that organisation encounter in implementing e-procurement solutions. Hence it is critical for management to ensure that employees are adequately developed to ensure that the adoption of e-procurement becomes a success (Sitar, 2011).

2.5 PLUMBING INDUSTRY

McNally (2013) identifies that for e-procurement to be successfully the adoption of the technology must not be limited to few supplies but the whole industry must move towards the same direction. He also adds that it is important for the stakeholders to have an understanding of the benefits that will be experienced by the industry as a whole in adopting e-procurement. Powell (2007) indicates that the plumbing industry can learn from the electrical industry concerning uniformity resulting in a better supply chain that benefits the whole industry.

Faloon (2000) views are that the integration process results in important information being exchanged between the supplier and the customer. Such exchange of information might improve stock holding days for the supplier as customers have a better view of what is available for sale. Integration between suppliers and customers have improved over the year but challenges still exist for smaller manufactures as they lack the necessary information technology and financial resources required to adopt e-procurement technologies (McNally, 2013).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Miodonski (2000) views is that the adoption of e-procurement technologies by plumbing manufactures and suppliers can drastically reduce order-entry errors and allow employees to conduct functions that add better value to the organisation than placing or taking orders. He also emphasize that plumbing manufactures and suppliers that embrace e-procurement technologies will increase productivity of their employees, reduce costly errors, and improve communication with their suppliers and customers.

2.6 THEORETICAL MODEL

This section will look at a theoretical model that organisation can utilised to understand the impact that supply chain technologies specifically e-procurement systems have on the performance of the business.

2.6.1 THE TECHNOLOGY ACCEPTANCE MODEL (TAM)

With the usage of technology for most administrative functions, these tools in most instances require users to interact directly with hardware and software (Davis, Bagozzi & Warshaw, 1989). Studies have revealed reluctance from end-user in utilising tools that they believe would generate significant performance gains (Davis *et al*., 1989).

Hence then researchers require a better understanding of why users/business adopt or reject the utilisation of technological solutions. The TAM model has been defines as one of the most used theories in understanding the factors that lead end-user to accept information technology systems (Purchase & Dooley, 2010).

Davis *et al.* (1989) defined the purpose of TAM as the ability to provide a basis for tracing the impact of external factors on internal beliefs, attitudes and intentions.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

The model identifies two factors that are primary influential for computer acceptance behaviour: perceived usefulness (U) and perceived ease of use (EOU). The diagram below depicts the TAM model.

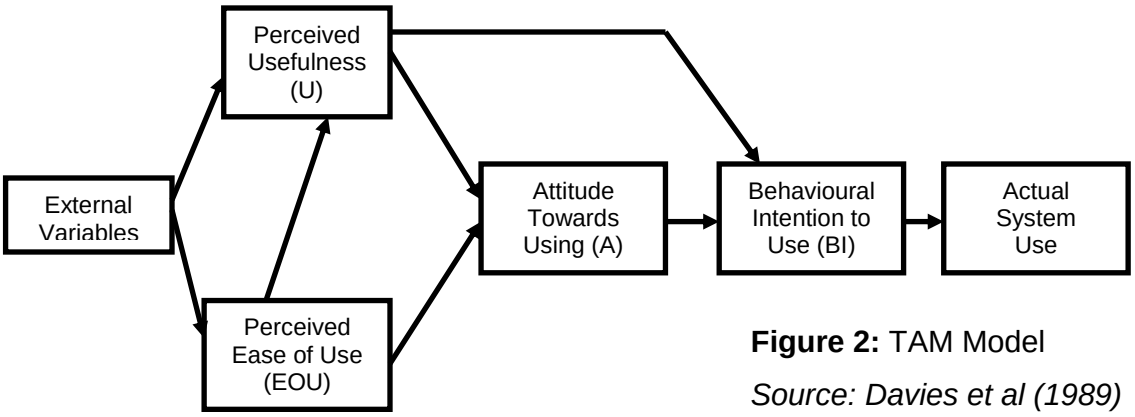


Figure 2: TAM Model

Source: Davies et al (1989)

Davis *et al.* (1989, p. 985) defines perceived usefulness (U) as the prospective end-user's subjective probability that using a specific information technology system will result in increased productivity within the organisational context.

Davis *et al.* (1989, p. 985) defined perceived ease of use (EOU) as the extent to which the potential end-user expects the application system to be user friendly. TAM further stipulates that technology adoption is determined by behavioural intentions

(BI) which is a combination of the end-user's attitude towards the adoption of the system (A) and perceived usefulness (U) (Davis *et al.*, 1989, p. 9865).

Due to the fact that the focus of this research is the adoption or non-adoption of e-procurement technologies, TAM provides a strong practical support to the adoption or non-adoption of e-procurement technologies research. The model will further illustrate the technological and social factors that influence the objectives to use e-procurement technologies.

Purchase & Dooley (2010) supports the usage of the TAM model as it had been mainly researched from an intra-organisational perspective, and e-procurement systems are inter-organisational as a result the inclusion of supplier aspects is imperative.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2.7 SUMMARY

The literature review has indicated the importance of collaboration and the sharing of accurate information to ensure efficiencies within the supply chain management of an organisation. E-procurement is about the integration and sharing of information between organisations. The organisations that are not geared to adopt such technologies might find themselves competitively disadvantaged. Information technology has allowed organisations to integrate with each other resulting in faster and better decisions being made. Increase efficiency, increase effectiveness, competitive positioning as well as external pressures have been the drivers in adopting inter-organisational information systems.

Benefits such as decrease in coordination cost, transaction risks, more-efficient inventory management and the automation and rationalizing of business processes have been attributed to the adoption of supply chain information technologies.

The literature review has identified that organisations spend at least one-third of their overall budget on procurement of products and services. Hence it is imperative for any organisation to ensure that efficiencies are built within the procurement process to ensure competitive advantage and profitability. The benefits associated with the adoption of e-procurement technologies included but not limited to the following, reductions of transactional costs, development of efficient business processes, increase in business collaboration, improvement of inventory management, increase better and accurate information sharing, reduction of labour costs and elimination of maverick procurement.

The focus was on the factors influencing the adoption of e-procurement technologies. From the supplier perspective the influence by buyers, the improvement of operations as well as the internal support from end-users and management where identified as the factors influencing the adoption of e-procurement technologies.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

3. CHAPTER 3 - DEFINING THE PROBLEM

The purpose of this research is to investigate the factors that have an influence on supplier's ability to adopt or not adopt e-procurement solution in the plumbing industry in the South African market.

The literature as well as the TAM models has highlighted that the adoption of e-procurement technologies depends on various number of internal and external factors. The literature review has identified that unquestionable benefits exist for the buyers who adopt e-procurement technologies and the buyers are influential in ensuring that suppliers adopt these technologies. The non-adoption of e-procurement technologies by a supplier might have a negative impact on their sales volumes and profitability. The research will focus on three dimensions to establish the influences that exist in driving organisations to adopt e-procurement technologies i.e. the influence that the customer has, the perceived internal operational benefits that exist as well as the internal support that is required.

Proposition 1

The influence by the customer/buyer is an important factor in the adoption of e-procurement technologies.

Proposition 2

The adoption of e-procurement technologies has a positive impact on the improvement of internal operations of the supplier.

Proposition 3

Internal support has a positive impact on the adoption of e-procurement technologies.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

4. CHAPTER 4 - RESEARCH METHODOLOGY

4.1 RESEARCH METHODOLOGY AND DESIGN

The aim of this study was to understand the factors that influence suppliers in adopting or not adopt e-procurement technologies. To have a better understanding of the factors that influence suppliers qualitative data collection was beneficial for this research. Qualitative data had the capabilities to provide better understanding on why supplier adopt or do not adopt e-procurement technologies (Eisenhardt, 1989). To ensure that adequate insights were obtained from this study an exploratory approached, which was likely deductive in nature was utilised and the propositions were developed around the factors that influence the adoption of e-procurement technologies (Smart, 2010).

The question raised by the researcher required a detailed exploration method, as quantitative approach would have risked over simplifying the issues such as the influence by the customer, benefits in internal operations, and the role of senior management in supporting such initiatives. Quantitative research methods which could have been conducted through a survey method had the potential of offering useful generalisation information but would not had been able to ascertain detailed, specific insights into the organisation decision making process (Smart, 2010).

Gordon (2011) has defined qualitative research as the understanding why organisation or individuals make decision in a certain manner. Due to the immature nature of EDI in the plumbing industry qualitative research methodology was an ideal approach as it allowed the researcher to be able to understand how work practices and organisational structures and cultures evolve, and the challenges experience by organisation in implementing changes (Garcia & Gluesing, 2013).

Qualitative research ensured that the researcher obtains an in-depth exploration and analyses of the factors that influence organisation from adopting e-procurement

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

technologies (Branthwaite & Patterson, 2012). This was supported by Gordon (2011) in that qualitative research is associated with the ability of obtaining insight about a complex challenges that an industry or an organisation might be experiencing. Garcia & Gluesing (2013) reasoning for using qualitative research methodology was its ability to provide insight about the new ways of working and the changes that exists from day to day work development. Hence qualitative research methodology was an ideal methodology to be utilised in gaining insight on the factors influencing the adoption of e-procurement technologies. Gordon (2011) also states that qualitative research methodology's strength is the ability to provide understanding on different issues from different industries.

The advantages of using qualitative testing for this research was that it could be used for several areas of research, including theory development, theory testing, construct validation, and the uncovering of new, emerging phenomena (Garcia & Gluesing, 2013). Qualitative research ensured that appropriate answers were identified to address the research question and a clear understanding was obtained to establish the factors that affect the adoption of e-procurement technologies. As a result of its flexibility qualitative research allowed the researcher to have direct interaction with organisations that have implemented e-procurement technologies resulting in appropriate information being obtained in understanding the adoption factors (Branthwaite & Patterson, 2012).

4.2 TARGET POPULATION

A population is a set group of members and the population need not be people employees or employees: it can, for example be organisations, places or the complete track listing for a music compact disc (CD) (Saunders & Lewis, 2012). The targeted population for this research consisted of all organisation that manufacture plumbing material as well as the plumbing distributors of plumbing products to the plumbing industry in South Africa. Miodonski (2000) has identified that the adoption of e-procurement technologies have been very slow in the plumbing industry, as a result

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

this industry was ideal in establish the factors that affect adoption of e-procurement technologies.

Preliminary interviews were conducted with the Chief Executive Officer as well as the Commercial Director of Plumblink South Africa (Pty) Limited which was the largest plumbing specialist merchant in Africa, and it was evident that the majority of their suppliers had not embraced e-procurement technologies when compared to other fast moving consumer goods organisations.

4.3 SAMPLING FRAME

Sampling frame is defined as the complete list of all members of the total population (Saunders & Lewis, 2012). Through analysing one of South Africa leading plumbing organisation the researcher was able to establish that just over 80% of 2013 financial year's procurement was divided into the following product categories:

- Water heating
- Copper
- Brassware
- Sanitaryware
- PVC

Due to the immaturity of e-procurement technologies in the plumbing industry five organisations were selected and two experts. The number of organisations and experts selected was a result of a limitation of not enough matured players in the adoption of e-procurement technologies in the plumbing industry in South Africa. Organisations selected for this research fall under the above stated product categories.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

4.4 SAMPLE METHOD

A sample is a subgroup of the whole population that is used by the researcher. The purposive sampling method was utilised in selecting the organisation for the research. Due to the fact that the following plumbing categories; water heating, brassware, copper, PVC and sanitaryware represented more than 80% of procurement that was done by one of the leading plumbing merchant in South Africa.

Table 4: Plumbing product category purchases from July 2012 to June 2013: Percentage split (Leading plumbing merchant in South Africa).

Product Category	Purchases in 2013
Water Heating	**26%**
Brassware	**18%**
Copper	**18%**
Sanitaryware	12%
PVC	**7%**
Copper Alternatives	**3%**
Stainless Steel	3%
HDPE	**2%**
Cast Iron	2%
General Plumbing	2%
Waste & Traps	1%
Accessories	1%
Galvanised	1%
Solar	**1%**
Rain Water Goods	1%
Tools	**1%**
Other	1%

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

The sample was selected from the suppliers that fall within these categories. Table 5 below list the companies selected and the categories they represent.

TABLE 5: Companies selected and the product categories

Company	Categories
A	PVC
B	Water Heating & Solar
C	PVC & HDPE
D	Brassware, Copper & Copper Alternatives
E	Tools

From the selected categories interviews were conducted from the manufactures of water heating systems and another from a copper manufacture that had not adopted e-procurement technologies. The adopters of e-procurement technologies were selected from the PVC and tools categories. The aim of the sampling plan was to be able to build detailed insight for adopters and non-adopters.

4.5 SAMPLE SIZE

The background information and rationale for the five organisation and two experts interviewed are presented as follows: the selected five organisations were the major suppliers and manufactures of plumbing material in South Africa. Since these five organisations were all at the top in their corresponding product categories, it further implied that the plumbing industry was highly dependent on them being efficient and first adopters of technologies that could benefit the industry. For the purpose of confidentiality, the five organisations were presented anonymously as A, B, C D and E respectively. A minimum of one employee and a maximum of four employees from the five organisation participated in interviews. Since e-procurement technologies were immature in the plumbing industry in some cases only the senior Operations and IT

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Managers were interviewed to give meaningful information that could add value to the research.

4.6 DATA COLLECTION

Data was collected from two experts from the electronic data integration industry as well as from five organisations that were suppliers and manufactures to the plumbing industry. Multiple respondents in these four organisations were interviewed from various organisational levels; senior and middle management from internal sales, purchasing, operations and Information Technology department as well as the direct system users (mainly internal sales). Employees that could provide the most details about the adoption of the e-procurement technologies, the usage and the implementation were identified.

A semi-structured interviewing process was used in gathering the data from selected organisation (interview questions are in Appendix A). The semi-structured data collection method allowed the interviewer to use predetermined questions at the same time give the ability to vary the order or omit some questions and ask additional questions that were appropriate (Saunders & Lewis, 2012). The changes to the questions during the interviewing process allowed the researcher to probe growing themes or obtain additional data (Eisenhardt, 1989).

The interviewing process allowed the researcher in collecting different viewpoints on the factors affecting the e-procurement, influences by customers, improvements in internal operations as well as internal support from different levels of the organisation. Altogether 11 interviews were conducted at the organisation's premises, and four were followed by telephonic conversation. All individuals interviewed were required to sign the consent form (consent form in Appendix B). The interviewing length was between thirty minutes to an hour and was recorded and transcribed.

The essence of this research is to advance academic knowledge at the same time provide valuable information to organisations. To achieve this it is important to be able

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

to obtain the information from the experts in the field, the managers and users of e-procurement technologies.

4.7 DATA ANALYSIS

The transcribed interviews were analysed and the data was coded into different themes. The diagram below depicts the process that was followed in analysing the data.

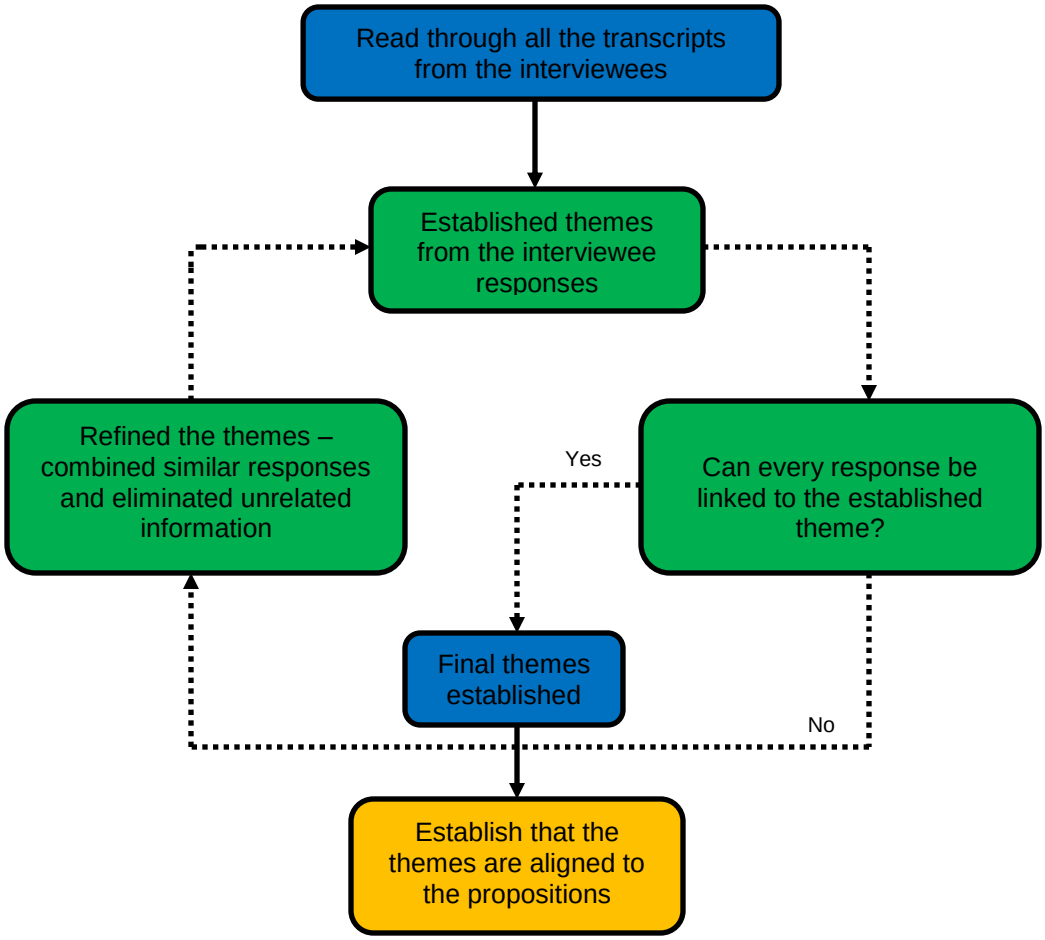


Figure 3: Data analysis diagram

The analysis was structured under the following headings:

- Influence by customers
- Improvement of internal operation and
- Internal support

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

4.8 LIMITATIONS

The limitation of the research was that the findings were specific to organisations that were trading in the plumbing industry. The research was based on business to business (B2B) only, excluding the relationship between suppliers and the public sector procurement. The research focused on the factors that affected suppliers and e-procurement factors affecting the consumer were not covered by the research.

The other limitation was that only three factors i.e. influence by customers, improvement of internal operations and internal support affecting the adoption of e-procurement technologies were examined in this research. It is possible that there were many other factors that could affect the organisation's decision in adopting e-procurement technologies. Future research should examine the influence of other factors such as competitiveness, customer service and the size of the organisation. Qualitative research methodology also has limitations, most notably the lack of generalisability to a large population of organisations (Fawcett *et al*., 2011).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5. CHAPTER 5: RESULTS

5.1 SAMPLING DESCRIPTION

Interviews were conducted comprising of organisation that have adopted e-procurement technologies as well as organisation that have not yet adopted these technologies. Listed below is the description of the organisations that were selected for the interview as well as job title of the individuals that were selected.

TABLE 6: Organisations selected for interviews and job title of the individuals

Company	No. of People Interviewed	Job Title	Adopted e-procurement Technologies
A	1	National Sales Manager	Yes
B	4	General Manager Operations	No
		Head of Internal Sales	
		Head of Procurement	
		System Administrator	
C	2	Systems & IT Manager	Yes
		Head of Internal Sales	
D	1	Managing Directors	No
E	1	Managing Director	Yes
Expert 1	1	Sales Director	N/A
Expert 2	1	Managing Director	N/A

Since such technologies have not matured in the plumbing industry two experts from organisations that supply EDI solution where interviewed to obtain an in-depth information on the adoption of e-procurement technologies. The role of the experts in

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

this research was to verify the data from the organisations interviewed as well as to provide additional data that could add value to the research.

5.2 CONTENT ANALYSIS

Five organisations presenting the high volume product categories were selected from the plumbing industry. Two experts to verify and add to the data were also interviewed. The data was analysed based on the themes that emerged from the coding processes. In addressing the propositions, the interviewees were questioned in relation to the influence of buyers, the perceived improvements in internal operations and the existence of adequate financial, technical and management support in implementing e-procurement technologies.

5.3 INFLUENCE BY CUSTOMERS

Through interviewing key individuals within these organisations as well as the experts in electronic data integration listed in ***TABLE 6***, below are the influences that have been identified that affect organisations in adopting e-procurement technologies.

TABLE 7: Influence factors on the adoption of e-procurement

Rank	Influencing Factors
1	Internal needs to address ineffective business process and increase productivity.
2	Influence from customers demanding better customer service levels, specifically customers that order high volumes.
3	Influenced by the perceived benefit of increasing volumes that will result in increasing profits

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.3.1 INFLUENCED BY AN INTERNAL NEED

Through the interviews that have been conducted, it was evident that the major influence for suppliers in adopting e-procurement technologies emanated from within the organisation. The Systems and Information Technology Manager from Company C alluded to the fact that the plumbing industry customers have not embraced the development of EDI technologies. Since Company C's head office was based in Germany, the South African operations were encouraged to introduce EDI technologies to their customers.

The Managing Director of Company A was a qualified computer programmer and as a result had been very interested in adopting e-procurement technologies. Company A's need to adopt e-procurement technologies also stemmed from internal requirements in streamlining their operations and allowing a high number of orders to automatically update the system.

Expert 1 and 2 concurred that e-procurement technologies have been driven by suppliers as perceived major benefits resided with them in terms of improvements in operations and costs savings.

The influence of the adoption for Company E, which is one of the leading suppliers of tools to the building and plumbing industry, was both internal and external factors. The Managing Director noted that even though the influence was not directly from customers, services levels forced them to implement e-procurement technologies. Customers required Company E to efficiently process their orders in terms of speed and accuracy and the solution that Company E implemented was e-procurement technology (EDI).

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.3.2 INFLUENCED BY CUSTOMERS

From the interviews conducted, only the Head of Internal Sales in Company B attributed the implementation of e-procurement technologies to the customers. This was a result of demands exerted by the customers requiring real time information from their suppliers such as stock availability, delivery schedules and the accuracy of the pricing.

The General Manager Operations from Company B did not agree, as he believed that due to the lack of intensive competition within the plumbing industry the suppliers are not investigating better options to appropriately service the clients. The General Manager Operation from Company B recently joined the organisation from a FMCG Company. Upon comparison, both industries and the advances in technologies that adopted his views revealed that the small number of suppliers in the plumbing industries, customers was forced to deal with the vendor's poor quality of service.

The Head of Procurement in Company B viewed the plumbing industry in the following manner:

> *"An old industry that used to make plans on the back of a cigarette box" as a result having no ability or know how to implement such technologies. As a result the influence is then exerted by the customer demanding better service".*

This statement is supported by Expert 1 that the building and construction industry which plumbing forms part of, has been lagging behind concerning the adoption of technologies that improves the efficiency of business. There exists a possibility that this may change in the near future as multinational organisations such as Wal-Mart have entered the South African market and could have an impact in ensuring that suppliers adopt e-procurement technologies.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Suppliers that are dominant or single manufacturers or distributors of products do not easily adopt these technologies as customers have limited options to force the suppliers to improve the levels of service.

5.3.3 INFLUENCED BY PERCEIVED VOLUME INCREASE

The National Sales Manager from Company A did not have expectations that the implementation of e-procurement will result in an increase in volumes that the customer procured. This was supported by the Managing Director of Company E as they have been using e-procurement technologies for the past four years and have not seen an increase in procurement volumes from the customers that they have integrated with. Although steady growth has been sustained by Company C on customers that they have integrated with, the Systems and Information Technology Manager does not attribute this growth to the adoption of e-procurement technologies.

Expert 1 indicated that increase in volume has been evident with suppliers that have embraced the adoption of e-procurement technologies. Customers find it easier to do business with suppliers with whom they have integrated with and in this way; they increase their business capacities with those that have implemented e-procurement technologies.

Most commonly, it is noted that suppliers adopt e-procurement technologies tend to focus on customers that represent the highest number of volumes in terms of orders. The customers that represent the highest volumes have been target by the suppliers for integration so that their orders are automatically updated by the system without human intervention. The Managing Director of Company E stated the following;

> *"We have target suppliers that obviously give us the most amount of business and might have complex price lists as well. The aim is to let the system do all the work for us".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

For example, Company C has focused on the top six customers that represent 60% of their volume. The difficulty is that they have only integrated with two of these organisations. The System and Information Technology Manager's views is that the South African plumbing industry is very immature when it comes to technology adoption, as a result challenges are experienced in convincing some of the customers to adopt e-procurement technologies. Company E's focus also had been on a small number of customers that represent the highest volume.

5.3.4 SUMMARY

The adoption of e-procurement solutions in the plumbing industry has been mostly influenced by suppliers. Mainly evident from the interviews conducted was that customers were not demanding such technology; as a result, suppliers have not invested in new technologies. Although there has been a perceived benefit that volumes will increase due to e-procurement, none of the suppliers has experienced such increases.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.4 IMPROVEMENT OF INTERNAL OPERATION

Through interviewing key individuals within these organisations as well as experts in electronic data integration listed in ***TABLE 6***, below are the perceived internal operations improvements that were identified to increase productivity and the efficiency of an organisation in adopting e-procurement technologies.

TABLE 8: Improvements in internal operations due to e-procurement adoption

Rank	Benefits
1	Cost saving as a result of time saving and improvement in speed of processing the order.
2	Elimination of data capturing errors and improves reliability of information.
3	Improvement in productivity and efficiency of internal operations.
4	Cost saving as a result of reduction in labour cost.
5	Decrease the exposure to fraudulent orders.
6	Better access to real time information and improvement to decision making.
7	Improve customer relations.
8	Redirect focus from order capturing to increase internal sales.

5.4.1 TIME SAVING AND SPEED OF DELIVERY

The major benefit evident in all the interviews was time saving as a result of the elimination of the manual capturing ordering process. The e-procurement technologies allowed the customer's orders to update the supplier's system without human intervention. The System and Information Manager from Company C indicated that the Internal Sales Clerk previously spent between four to six hours capturing orders, whereas currently as a result of e-procurement technology this is achieved in forty-five minutes. This was supported by the Head of Internal Sales as well as Expert

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2 that e-procurement has been a tremendous time saver and has eliminated the need by Internal Sales Clerks to capture their orders as the system is automatically updated.

From the time the order is uploaded on the supplier's system to the time of delivery, the speed of this process has also improved. In interviewing Expert 1 the big advantage for e-procurement adoption from the supplier's perspective is the speed they are able to respond to customer orders, allowing them to improve turnaround time and service delivery.

The Managing Director of Company E has experienced the same benefits concerning better utilisation of time by Internal Sales Clerks. The elimination of the manual capturing process has resulted in the reduction of time taken to capture an order into the system, what took a number of hours in the past is currently done in seconds. The focus has been to automate all procurement functions that can be conducted by e-procurement technologies and ensure that personnel focuses on maintaining and monitoring customer relations. The Managing Director has also stated that an e-procurement technology has given his organisation the ability to deliver items to the customers faster with fewer mistakes.

The speed that the supplier is able to deliver on the order has a positive impact on the customer as it results in less stock outs on the customer side and the ability to be able to service the market better. If the supplier is able to get it out, the customer can get it in faster, and they can sell it quicker.

The views from the Managing Director of Company D was that e-procurement has the potential of assisting his organisation by quickly confirming the order and ensuring that customer needs are adequately addressed through speed and accuracy, resulting in streamlining the process.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.4.2 REDUCE ERROR RATE AND IMPROVE DATA INTEGRITY

Reduction of capturing errors was the benefit that was stated by some of the interviewees. The National Sales Manager from Company A recognised that the adoption of e-procurement technologies reduced the capturing errors (pricing, quantities and product description) resulting in correct items and quantities being delivered to the customers. As a result of accurate capturing, credit notes processing as well as redeliveries have been drastically reduced resulting in cost savings.

This was supported by the System and Information Technology Manager from Company C as he stated the following:

> *"Absolutely, the adoption of e-procurement technologies has reduced the number of errors e.g. pricing and quantities as the credit notes have definitely decreased even though I can't give you an accurate percentage".*

Expert 2 view was that as a result of elimination of human intervention from the capturing process of orders, the capturing of incorrect part numbers as well as quantities is eliminated. He stated the following:

> *"Most of the organisations that I have assisted with the implementation of e-procurement technologies, they love it; they absolutely love EDI because now their orders are processed 100% correctly".*

Expert 1 attributed the accuracy of data to the adoption of e-procurement technologies as it eliminated the capturing errors. Expert 1 commented:

> *"People make finger errors, they go on leave, they forget to load an order, all of these challenges that occur costs the business, as incorrect or delayed information is captured on the system. The accuracy of the data is one of the main drivers for adoption of e-procurement technologies".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

The Managing Director of Company D was able to link financial benefit as a result of reduction in error rate as well as the accuracy and integrity of information. His views were as follows:

> *"If I look at the financial benefits side, as there are financial benefits for both sides (Supplier and Customer) in that the accuracy of invoicing, the accuracy of reconciliation for accounting etc., there are a number of benefits and pluses that come into play by having a system that minimizes the human error".*

5.4.3 PRODUCTIVITY AND EFFICIENCY OF INTERNAL OPERATIONS

The information obtained from the National Sales Manager of Company A is that Internal Sales Personnel prior to implementing e-procurement technologies spend the majority of their day capturing orders. Post e-procurement implementation, with increasing volumes, orders are loaded into the system within minutes resulting in productivity improvements.

An e-procurement technology has allowed Company A to schedule and smooth their ordering runs to ensure that labour is efficiently utilised. This has eliminated inconsistency in the number of orders that needs to be picked and has improved labour utilisation in the warehouse.

Due to the efficiency of internal operations, Expert 1 attributed on-time payments by customers by stating the following:

> *"On-time payments increase quite dramatically because there is less claims and less queries so suddenly the money that's owed to you (the supplier) is in your bank and not sitting waiting for 90 days or 120 days while we're trying to resolve why there's a discrepancy between what I ordered and what you delivered or the price I was expecting to pay".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Expert 1 – The lack of implementing e-procurement technology negatively affects productivity as fielding of orders through emails and telephones from clients may not be processed if the Internal Sales person is on leave and could result in late deliveries and unsatisfied customers. To improve productivity of the Internal Sales Department the comments of the System and Information Manager from Company C are as follows:

> *"So the intention, from our side (IT Department), is to get them (Internal Sales Personnel) away from being paper pushers and to being involved in more value-adding functions".*

The inefficiencies experienced in not adopting e-procurement technologies are evident in Company B as the following process is described by the Head of Internal Sales concerning the capturing of orders:

> *"So, they capture all their orders, I then have a supervisor that checks every single order every single day, when it is captured".*

5.4.4 REDUCTION IN LABOUR COSTS

The reduction in labour cost has not been as a result of retrenchment, what has been evident from the interviews is that with increasing volumes labour costs has remained the same as a result of e-procurement technologies. The National Sales Manager from Company A stated the following:

> *"Although there has been an increase in the number of orders that we process on a daily basis, there has not been an increase in personnel costs. As a result, the return on investment can be measured by the savings in labour cost".*

The System and Information Manager from Company C also agreed that there has not been necessarily a reduction of staff, but the adoption of e-procurement has allowed Internal Sales Personnel more capacity to focus on functions such as customer

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

service, forecasting etc. This was supported by the Managing Director of Company E as he stated the following:

> *"Well for me, the way I quantify it is that I do not have to employ more staff to be data-capturers; and the staff that were there can now, instead of being data-capturers only, can become a sales person as well".*

Expert 1 indicates that the adoption of e-procurement technologies has a huge impact on labour costs. Using an example from an organisation that he assisted in implementing e-procurement technology, he stated the following:

> *"We process for them (the client- supplier) anything between R8 to R14 million worth of orders a month, through EDI, and let's say it costs them R10 000 for them to use this service on a monthly basis. To increase staff personnel by 5 individuals as a result of volume increase will cost the client a minimum of R15 000 per month per person to manually handle order capturing. Instead of spending R15 000 per employee the client spends only R10 000 per month for the entire service to handle the order capturing process. The existing data capturers don't get fired. They don't get put out of a job. They are used for what they actually need to do i.e. interact more with the customer".*

5.4.5 DECREASE THE EXPOSURE TO FRAUDULENT ORDERS

The unexpected benefit that was realised by Company C in adopting e-procurement was the reduction in fraudulent activities. Even though this could not be accurately measured the occurrence of such instances had drastically reduced. This was confirmed by the Head of Internal Sales in Company C that:

> *"With one of our major customers, we used to experience a number of fraudulent orders whereby a fraudster will forge the customer order and collect the goods resulting in the company losing stock. With the implementation of e-*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

procurement, orders are automatically updated on the system, eliminating human intervention and fraudulent orders".

The Managing Director of Company C agreed that e-procurement reduces fraudulent orders but stated that it does not eliminate fraud since fraudsters are able to explore other avenues to access the system if the security is not adequate.

The elimination of human intervention closed the opportunity for the operator to conduct fraudulent activities. Expert 1 views are that the reduction of fraudulent transactions is not derived from e-procurement technologies but instead stem from Internal Sales Personnel not being given the opportunity to capture orders reducing the possibility of fraud.

The Managing Director of Company D views e-procurement as eliminating the risk of fraudulent orders and stated the following:

"E-procurement also minimizes the risk of fraudulent orders. Anything that gives you a bit more security gives you a bit more comfort knowing that it's not something that can be easily hacked, what forms part of that package is accuracy and peace of mind and the benefits are all there in the bigger picture".

5.4.6 ACCESS TO ACCURATE INFORMATION AND IMPROVEMENT TO DECISION MAKING

The adoption of e-procurement involves sharing of information between the customer and supplier hence the accuracy of information is critical to make correct decisions. Through the interviews, Expert 1 illustrated the importance of accurate information in the following scenarios:

"The product has been delayed in shipping from China. We've got to wait for two weeks so hold the promotion by two weeks, or whatever the case might be but

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

that communication back and forth is critical to the success of the e-procurement".

"What's the price of it today? You can see the price and you can order it and you can do it 24 hours a day. So, once your business has closed down at 17h00 you can go home, have dinner, it is now 20h00, you've got your beer in your hand and you are sitting there and you are thinking, "Oh... I forgot to order today." You log on and place the order".

The Head of Procurement from Company B views e-procurement as empowering the employees as he identifies that the biggest benefit is that users are being better informed through access of accurate information and are able to make adequate decisions. The sharing of information between the supplier and the customer ensures that both parties benefit from the adoption of e-procurement technology.

Due to the sharing of information between the two parties the Managing Director from Company D, attribute benefits to e-procurement that decisions are made by the supplier and the customer to streamline business processes, monitor and manage stock availability and ensure quick turn-around time from ordering to delivering.

5.4.7 IMPROVE CUSTOMER RELATIONS

According to Expert 1, the adoption of e-procurement improves the entire supply chain in terms accurate and correct invoices, reduce credit notes, correct statements and remittance. All these ease the relationship and actually cement the relationship between the customer and the supplier.

In adopting e-procurement solutions, the supplier strengthens the relations with the customer resulting in ease of doing business. Expert 1 emphasizes on this statement by stating the following:

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

"If you're not part of it, you run the risk of losing clients because it is easier for the customer to order from you if you are part of the solution or part of the platform. So there is definitely that benefit".

Expert 2 views better customer relations as another benefit of e-procurement adoption. Due to the adoption of e-procurement solutions, the Internal Sales Personnel has the ability to utilise the extra capacity in concentrating on the client and giving expert advice.

The Managing Director of Company D agrees that the spinoff in adopting e-procurement is that it becomes easier for their customers to do business with them, resulting in increased sales and improving and maintaining service levels. The Managing Director stated the following:

"My first concern is to improve the customer situation in dealing with us because it's not what we want but what the customer wants that drives everything".

5.4.8 INCREASE SALES

The adoption of e-procurement solutions has allowed the Internal Sales Personnel to focus on doing sales rather than spending the majority of their time on capturing orders. The Head of Internal Sales from Company B agrees with this statement as she stated the following:

"In reducing their (Internal Sales Staff) time of order capturing, I can free them up for more active telesales".

Supported by the General Manager from Company B that:

"The focus is to ensure that the Internal Sales Department reduces the time spent on order capturing and increase telesales thereby increasing turnover".

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Expert 1 view is that the adoption of e-procurement solution transforms the Internal Sales Department from a cost centre to a revenue generation function. This was substantiated by what he said that:

> *"So they can move it from an inbound call centre to an outbound call centre and as an inbound call centre they are a cost to company and a liability to company".*

> *"I think it was client X that did an exercise where for every 1 000 orders that we can send into their call centre environment they can take an inbound call centre agent, receipting orders, and turn them into a sales generating deed on the outbound call centre side, following up with clients, giving customer service etc".*

5.4.9 SUMMARY

E-procurement adoption largely benefits the suppliers. E-procurement adoption allowed suppliers to be able to move personnel from a non-adding value function to a revenue generated position. The internal processes within some of these organisations have improved resulting in few capturing errors, pricing queries as well as redeliveries. Due to adoption of e-procurement technologies the internal sales function, spends more time in doing sales rather than capturing orders.

The major cost saving has been on the labour force. With the implementation of e-procurement technologies organisations are able to handle an increase in volume without increased personnel. Personnel's focus is redirected in interacting more with the client, resulting in improved customer relations.

A surprising factor to some organisations was the impact that e-procurement had in decreased fraudulent transactions. The access to accurate and reliable information has allowed the organisations that have adopted e-procurement to make accurate and fast decisions.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.5 INTERNAL SUPPORT

Through interviewing key individuals within these organisations as well as the expert in electronic data integration listed in ***TABLE 6*** below are the internal support factors that must be present to ensure success of the e-procurement solution.

TABLE 9: Internal support factors in the adoption of e-procurement solution

Rank	Support Factors
1	Internal or external technical support
2	Senior management and user support
3	Availability of financial resources

5.5.1 TECHNICAL SUPPORT

The implementation of e-procurement solutions depends on the internal or external technical support that the organisation must obtain. The National Sales Manager from Company A identified that their earlier failures was attributed to the lack of technical expertise within the organisation. This was in spite of them having an individual within their organisation that was a programmer, he was however not a specialist in EDI and therefore was unable to deliver a working solution.

The tendency of the Information Technology Department is that they are able to roll out solutions without external involvement. Expert 1 has noted the following concerning IT Department involvement in rolling out e-procurement technologies:

> *"There will be an initiative that will come down from head office etc. and the IT manager, typically in South Africa, will put up his hand and say, "I can do that." Even though I've got no expertise or whatever, we always want to own what we can".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

In view of the lack of internal expertise within organisations, external service providers have been utilised by organisation to roll out e-procurement technologies.

5.5.2 SENIOR MANAGEMENT AND END-USER SUPPORT

Senior management support and sponsorship is important for any organisational project to be successful. The same applies to the users, as there is a requirement to accept and embrace the change. Senior management from Company A has been scanning the environment and had spotted the trend hence it was easier for the organisation to adopt e-procurement technologies.

Company B has the same plans to adopt e-procurement technologies as stated by the General Manager Operations that approval has been received from senior management as he stated the following in the interview:

> *"The Managing Director is quite a visionary guy hence it was not very difficult for me to sell the e-procurement solution".*

The Systems and Information Technology Manager from Company C indicated that e-procurement in their organisation had been successful as a result of user buy-in. To illustrate the support from the users the Systems and Information Technology Manager shared this scenario:

> *"Just the other day there was a hiccup with one of our largest customers, where the orders were not coming through, and we asked them whether they wanted to manually capture their orders because the system was not pushing them through. And the answer was, "No, we're going to wait." They would rather wait a day than try to manually capture it".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

5.5.3 AVAILABILITY OF FINANCIAL RESOURCES

Financial support was another element that the interviewees noted as important for the adoption of e-procurement technologies. The Systems and Information Technology Manager from Company C alluded to the fact that other organisations are unable to implement such solutions as a result of financial difficulties. The importance of financial support was illustrated by the following response:

> *"We've had all the funding we've needed to date. The executives clearly understand the direction and the benefits that we have from a system like this so I couldn't ask for any better support".*

The Managing Director from Company D agreed that financial support was important for them in rolling out an e-procurement solution. Since the head office was based in France, it made it easier for them to access the required funds.

5.5.4 SUMMARY

The difficultly that has been expressed by most interviewees is the ability to quantify the return on investment. Other than using pre and post adoption measurement such as capturing error rates, number of credit notes and redeliveries it has been challenging to quantify the financial benefit.

5.6 CONCLUSION

The success of e-procurement solution is to ensure that the whole supplier chain is integrated. For it to really be beneficial, the plumbing industry must be able to move towards the same direction i.e. customers and suppliers. The interviews have reflected that the plumbing industry is lacking in technology adoption when compared to other industries.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6. CHAPTER 6: DISCUSSION OF RESULTS

6.1 PROPOSITION 1

The influence by the customer/buyer is an important factor in the adoption of e-procurement technologies.

6.1.1 INFLUENCE BY AN INTERNAL NEED

The data showed that the influence to adopt e-procurement technologies have been driven by suppliers as perceived major benefits resided with them in terms of improvements in operations and cost savings.

The influence by suppliers in the adoption of e-procurement technologies is supported by Panda & Sahu (2012) in stating that suppliers are the most important stakeholders in ensuring success implementation of an e-procurement system. Dooley & Purchase (2006) also state that suppliers exert pressure on their customers in the utilisation of e-procurement technologies to reduce costs, improve sharing of information and increase operational efficiencies.

The adoption of e-procurement technologies emanated from the internal needs of the suppliers and this was supported by the views of Company A, C and E as well as both experts interviewed. Smart (2009) indicated that suppliers play a critical role in ensuring that their customer's e-procurement solution was successfully adopted but also can resist the change if there was a possibility of rationalising the supplier numbers.

Therefore the data references that adoption of e-procurement technologies are mostly driven from within the organisation rather than by customers.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.1.2 INFLUENCE BY AN CUSTOMERS

The research showed that the adoption of e-procurement technologies was not mostly influenced by customers.

Due to the fact that buyers benefit from the implementation of e-procurement through better management of information across all areas of the purchasing function, has a greater influence and control over the purchasing process (Sitar, 2011). This was not supported by the results obtained from the interviews, as stated above the majority of the suppliers and experts interviewed identified the major influence in adopting e-procurement technologies was a supplier's internal needs.

The existence of power imbalances with the major supplier in the plumbing industry has diminished the possibility of customers exerting pressure on the supplier to adopt e-procurement technologies.

6.1.3 INFLUENCE BY VOLUME INCREASE

The data reflected contradicting view concerning the increase in volumes as a result of adopting e-procurement technologies. The National Sales Manager from Company A, Managing Directors from Company E as well as the Systems and Information Technology Manager from Company C did not attribute the increase in sales to the adoption of e-procurement technologies.

This was in contradiction to the views of Percy & Giunipero (2008) that organisations that fail to adopt integration e-procurement technologies might find themselves competitively disadvantaged. There was no evidence to associated profitability of the organisation with the adoption of e-procurement technologies, as a result the data was in direct contradiction with Devaraj *et al.* (2012) findings that organisational collaborations reflects a strong direct impact on the organisational profitability.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Therefore the data did not find any link between increases in volumes, which could result in profitability of the organisation to the adoption of e-procurement technologies.

6.1.4 SUMMARY

The major influence from the suppliers in adopting e-procurement technologies emanates from within the organisation. This was supported by Archer, *et al.* (2008) that the internal drivers that influence suppliers in the adoption of e-procurement include increase efficiency (transaction cost reductions and information distortion reduction), increase effectiveness (supplier relationships, and new organisational capabilities) and competitive positioning. Devaraj*, et al*. (2012) also argues that the automation of the organisation procurement process is driven from an internal need, as it has a positive impact on the improvement of business operations as well as the reduction in expenses.

6.2 PROPOSITION 2

The adoption of e-procurement technologies has a positive impact on the improvement of internal operations of the supplier.

6.2.1 TIME SAVINGS AND SPEED OF DELIVERY

The evidence presented by the findings was that e-procurement adoption allowed organisations to save time through the automation of the order capturing processes. This also resulted in improved turn-around time, as the time taken from receiving the order to delivering to the customers was decreased. These findings were supported by Piotrowicz & Irani (2010) as they state that e-procurement technologies enables the end-user access to information easier and faster, resulting in time savings and speedily service to the customer.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Smart (2010) further illustrate this finding by pointing out the advantages of e-procurement adoption as lowering of purchasing costs, improvement of communication, reduction in transactional costs, faster cycle times and improvement in procurement personnel efficiency. Vickery *et al.* (2010) attribute to e-procurement technologies the reengineering of business processes by simplifying activities, elimination of delays, eliminating non-value functions, and accelerating the flow of materials and products.

The adoption of e-procurement technologies improves internal operations by ensuring that customer orders are processed and delivered timeously.

6.2.2 REDUCE ERROR RATE AND IMPROVE DATA INTEGRITY

The adoption of e-procurement technologies eliminated the manual capturing of orders resulting in less errors occurring. Electronic data integration eliminates human intervention improving data integrity. This was supported by the System and Information Technology Manager from Company C as he stated the following:

> *"Absolutely, the adoption of e-procurement technologies has reduced the number of errors e.g. pricing and quantities as the credit notes have definitely decreased even though I can't give you an accurate percentage".*

The adoption of e-procurement technologies improves internal operations as the automation allows a single point of data entry improving data exchange with the suppliers and eliminating the mistakes of data entry and transmission (Piotrowicz & Irani, 2010).

Therefore the data references that the adoption of e-procurement technologies improves internal operations by reducing the capturing of orders error rate and data integrity.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.2.3 PRODUCTIVITY AND EFFICIENCY OF INTERNAL OPERATIONS

Expert 1 as well as the System and Information Manager from Company C attributed improvement of productivity and the internal operations to the adoptions of e-procurement solutions. The automation of the procurement process ensured that internal process are streamlined resulting productivity increase. To improve productivity of the Internal Sales Department the comments of the System and Information Manager from Company C were as follows:

> *"So the intention, from our side (IT Department), is to get them (Internal Sales Personnel) away from being paper pushers and to being involved in more value-adding functions".*

This is supported by Piotrowicz & Irani (2010) that the adoption of e-procurement technologies increases productivity through an automatic invoicing system, as earlier payments improves financial performance. Abu-Elsamen *et al.* (2010) attributes 42 percent in purchasing costs savings to the adoption of e-procurement technologies as a result of simplification in purchasing process and reduction in in purchasing cycle time. This allows the supplier to be more flexible and provide accurate information at the time of placing a purchase order.

The adoption of e-procurement technologies improves organisational internal operations by being more productive and efficient.

6.2.4 REDUCTION IN LABOUR COSTS

The adoption of e-procurement has not decreased labour cost but has ensured that they do not increase. Through the interviewing process the organisations that have adopted e-procurement technologies have not retrenched employees to reduce cost as a result of implementing e-procurement technologies. What has been evident is with the increase in sales volumes the same head count has been utilised, in other

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

cases excessive staff has been deployed to other departments. The National Sales Manager from Company A stated the following:

> *"Although there has been an increase in the number of orders that we process on a daily basis, there has not been an increase in personnel costs. As a result, the return on investment can be measured by the savings in labour cost".*

This is supported by Piotrowicz & Irani (2010) as they state that the utilisation of e-procurement technologies increase efficiencies, due to the fact that the same number of people can process higher numbers of orders, despite increase in sales. The adoption of e-procurement technologies allows the organisations not to increase head count in the procurement department with increase in volumes.

This is in contradiction to the views of Purchase & Dooley (2010) as they indicate that through the survey that was conducted in 2006 showed that staff levels had increased with the adoption of e-procurement technologies instead of reducing.

Although there are contracting views based on the literature, the research has shown that e-procurement technologies reduce labour costs by maintaining the same staff levels in the purchasing department with increasing volumes.

6.2.5 DECREASE THE EXPOSURE TO FRAUDULENT ORDERS

The data showed that e-procurement adoption indirectly reduced fraudulent transactions. This was confirmed by the Head of Internal Sales in Company C that:

> *"With one of our major customers, we used to experience a number of fraudulent orders whereby a fraudster will forge the customer order and collect the goods resulting in the company losing stock. With the implementation of e-procurement, orders are automatically updated on the system, eliminating human intervention and fraudulent orders".*

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

The unexpected benefit by Company C that the adoption of e-procurement resulted in a reduction of fraudulent activities was supported by Piotrowicz & Irani (2010) that e-procurement technologies improves controls at end-user level, resulting in employees having a pre-defined function and inability to conduct any activity that is not defined in the system. This indirectly results in e-procurement technologies acting as a fraud prevention system.

With limited manual intervention in the procurement process as a result of the automation process the gap to process fraudulent orders is minimised. This is supported by Mahalik (2012) that the adoption of e-procurement technologies reduces corruption, saves time by more efficient and faster business processes, and makes it easier to conduct. Panda & Sahu (2012) also attributes the reduction of corruption to the adoption of e-procurement solutions.

It is therefore correct to conclude that the adoption of e-procurement technologies decrease the exposure to fraudulent orders.

6.2.6 ACCESS TO ACCURATE INFORMATION AND IMPROVEMENT TO DECISION MAKING

Electronic data integration allows organisation to exchange information resulting in quicker and better decisions being made. The Head of Procurement from Company B alluded to the fact that sharing of information between the supplier and the customer ensures that both parties benefit from the adoption of e-procurement technologies as better decisions are taken. This was supported by the Managing Directors from Company D that decisions made results in the supply chain being streamlined and ensuring quick turn-around time from ordering to delivering.

The findings are supported by Chang, Tsai & Hsu (2013) as they state that e-procurement technologies have the ability to facilitate the information flow and activity coordination among supply chain partners. This results in accurate information being shared so that appropriate decisions can be made by members of the supply chain.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Devaraj *et al.* (2012) argues that organisations that extensively share information with suppliers or customers can respond to the changing environment with agility. Devaraj *et al*. (2012) further argues that the supply chain coordination is negatively affected when decision makers have incomplete or inaccurate information concerning the latest customer's demand.

Therefore the data references that adoption of e-procurement technologies ensures that stakeholders get access to accurate information that improves decision making.

6.2.7 IMPROVE CUSTOMER RELATIONS

Findings from the research have indicated that adoption of e-procurement technologies has a positive impact on the supply chain in terms of accurate invoicing, reducing credits notes and improve customer relations. E-procurement solutions strengthen the relations resulting in ease of doing business. The adoption of e-procurement technologies allows organisations to have flexible business processes resulting in firms having the capabilities to respond efficiently to evolving customer requirements (Devaraj *et al*., 2012).

Dooley & Purchase (2006) views support the research finding as they state that e-procurement solution is a tool that assist the supplier and the customer in developing a relationship to ensure that both parties have a willingness and future intentions to adopt electronic data integration solutions. Vickery *et al.* (2010) also state that the adoption of e-procurement technologies has capabilities in positioning the organisation to better identify and adequately respond to changing customer requirements and dynamic business environment.

The integration of the supplier's and customer's systems as a result of e-procurement has the potential of solidifying the relationship resulting in a willingness to take greater risks when it comes to changing existing business practices. Therefore the adoption of e-procurement technologies improves customer relations.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.2.8 INCREASE SALES

Research findings indicated that the adoption of e-procurement technologies freed time from the Internal Sales personnel relinquishing the function of capturing orders and focusing more on increasing sales and customer service. The Head of Internal Sales from Company B agrees with this statement as she has said the following:

> *"In reducing their (Internal Sales Staff) time of order capturing, I can free them up for more active telesales".*

Supported by the General Manager from Company B that:

> *"The focus is to ensure that the Internal Sales Department reduces the time spent on order capturing and increase telesales thereby increasing turnover".*

This is supported by Dooley & Purchase (2006) that e-procurement decreases the time spent by internal sales personnel on administrative functions and allow them to concentrate more on strategic issues.

Purchase & Dooley (2010) further support the finding by indicating that reduction of the administrative aspect of the procurement function result in the procurement personnel having ample time on the strategic aspects of the procurement function such as implementing supplier development programmes, improving supplier relations, and improve communication processes resulting in increased sales.

Therefore the data references that the adoption of e-procurement technologies increases the organisation's sales performance as it allows the internal sales staff to reduce the time spent on administrative function and increase the time spent on sales.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.2.9 SUMMARY

The data has shown that the adoption of e-procurement technologies has a positive impact on the improvement of internal operations of the supplier. The automation of the procurement process allows the organisation to reduce the time taken from processing the order to fulfilling the delivery. Reduction of capturing error rate is also evident as human intervention is limited resulting in correct data being shared between the customer and the supplier.

There are number of benefits that supplier experience in adopting e-procurement technologies (see table 2). E-procurement adoption encourages organisations to streamline their business processes resulting in better productivity and efficiency levels. Efficiencies are supported by better financial performance as with increasing sales volumes the labour costs remain stagnant improving the bottom line of the organisation.

The indirect benefit such as decrease exposure to fraudulent orders has a potential of influencing supplier to adopt e-procurement technologies. E-procurement adoption also enables stakeholder access to accurate information resulting in better decision making process. This improves customer relations resulting in improvement in sales for the supplier.

6.3 PROPOSITION 3

Internal support has a positive impact on the adoption of e-procurement technologies.

6.3.1 TECHNICAL SUPPORT

The research has shown even though organisations might not have internal technical support external service providers have been utilised by some organisations in implementing e-procurement technologies.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Abu-Elsamen *et al*. (2010) identifies absence of technical infrastructure required to support business operations, information security as well as privacy of exchange as one of the major reason why organisation do not adopt e-procurement.

It is therefore critical for the organisation to have technical support either internal or external to successfully adopt e-procurement technologies.

6.3.2 SENIOR MANAGEMENT AND END-USER SUPPORT

The data has shown that e-procurement adoption can only be successful where there is full support by senior management and internal support by the end-user. To illustrate the support of the end-users the Systems and Information Technology Manager from Company C shared the following scenario:

> *"Just the other day there was a hiccup with one of our largest customers, where the orders were not coming through, and we asked them whether they wanted to manually capture their orders because the system was not pushing them through. And the answer was, "No, we're going to wait." They would rather wait a day than try to manually capture it".*

The adoption of the e-procurement system strongly depend on the organisation commitment specifically senior management not neglecting support for the relationships between information flow process quality, logistics fulfilment quality processes, and e-procurement satisfaction performance (Panda & Sahu, 2012).

Therefore the data references that it is impossible to successfully adopt e-procurement technologies without the support from senior management and buy-in from the end-user.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

6.3.3 AVAILABILITY OF FINANCIAL RESOURCES

The data showed that financial support was essential for successfully adopting e-procurement technologies. This was supported by the statement made by the Systems and Information Technology Manager from Company C that:

> *"We've had all the funding we've needed to date. The executives clearly understand the direction and the benefits that we have from a system like this so I couldn't ask for any better support".*

Dooley & Purchase (2006) argues that staffing levels, training in new technologies, encouragement from management, sufficient financial resources and adequate budget allocation are the internal factors that are vital for an organisation to adopt e-procurement technologies.

Therefore the data references that the availability of financial resources has a direct impact on the adoption of e-procurement technologies.

6.3.4 SUMMARY

The data has shown that for adoption of e-procurement to be successful technical support must exist. The support does not necessarily have to be internal as organisations can utilise third party service providers in successfully implementing e-procurement technologies. Senior management also has a significant role to play as they sponsor the initiative, encouraging the end-users to embrace the change.

Without appropriate financial support it is not possible to adopt e-procurement technologies, hence it is important for management to commit by making sure that financial resources are available.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

7. CONCLUSION

7.1 INTRODUCTION

Aboelmaged (2010) has identified that the majority of organisation's funds are spent on the procurement of material and services to support organisations activities. The indication is that at least one-third of the organisation's budget is spent on procuring product and services (Quesada *et al.* 2010). Management priorities then should be the establishment of strategies and appropriate technologies that will ensure cost reduction within the procurement function.

This research has shown that the adoption of e-procurement technologies could form part of the strategic plan that could be adopted by management in reducing procurement and the related costs. The aim should be to streamline operations between the customer and the supplier ensuring that inefficiencies are eliminated by all stakeholders within the supply chain. This view is supported by Abu-Elsamen *et al.* (2010) who attributes 42 percent in purchasing costs savings to the adoption of e-procurement technologies as a result of simplification in purchasing process and reduction in purchasing cycle time. This allows the supplier to be more flexible and provide accurate information at the time of placing a purchase order to the time of delivering to the customer.

The plumbing industry has been a late adopter of business technology advances (Bas, 1999). The challenges faced by plumbing industry has been the transparency and the exchange of data between organisations to track product sold, reduction in inventory or the return of stock to the manufacture (Bas, 1999). The adoption of e-procurement technologies has the potential of fast tracking the South African's plumbing industry to be in par with the FMCG industry concerning the agility of the supply chain. McNally (2013) identifies that for e-procurement to be successfully the adoption of the technology must not be limited to few suppliers but the whole industry must move towards the same direction.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

7.2 FINDINGS SUMMARY

7.2.1 INFLUENCE BY CUSTOMERS

Panda & Sahu (2012) suggest that suppliers are the most important stakeholders in ensuring success implementation of an e-procurement system. The data reflected that customers had limited influence in persuading suppliers or manufactures in adopting e-procurement technologies. The existence of power imbalances with the major suppliers and manufactures in the plumbing industry has diminished the possibility of customers exerting pressure on the suppliers or manufactures to adopt e-procurement technologies. Dooley & Purchase (2006) also state that suppliers exert pressure on their customers in the utilisation of e-procurement technologies to reduce costs, improve sharing of information and increase operational efficiencies.

The notion that customers have an advantage on their suppliers to adopt e-procurement technologies resulting in increase in volumes was not supported by the data. The data reflected that there was no link between an increase in volumes with the adoption of e-procurement technologies. This contradicted Percy & Giunipero (2008) findings that organisations that fail to adopt integration e-procurement technologies might find themselves competitively disadvantaged.

The data made it clear that suppliers and manufactures internal needs were the major drives of e-procurement technologies. Suppliers and manufacture were mostly driven by the perceived internal benefits that could result in the reduction of procurement costs as well as the improvement of internal operational processes. The customers had limited influence in driving suppliers or manufactures in the plumbing industry to adopt e-procurement technologies.

Therefore the data references that adoption of e-procurement technologies are mostly driven from within the organisation rather than by customers.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

7.2.2 IMPROVEMENT OF INTERNAL OPERATIONS

The internal drive from the supplier perspective to implement e-procurement technologies is supported by the benefits reflected by the research data. Mahalik (2012) study reveals that e-procurement improves operational processes and allows management to make better decisions and better manage its operations.

E-procurement technologies allowed the suppliers or manufactures to streamline their procurement process resulting in time saving. The ability to save time through decrease manual intervention in the procurement process improved the turnaround time resulting in speedy deliveries. The adoption of e-procurement technologies improves internal operations by ensuring that customer orders are processed and delivered timeously.

The difficulty with technology investments is the measurement of the return on investment. Even though organisations find it difficult to measure ROI, the reduction of the error rate as well as the improvement of data integrity improves the internal operations of an organisation. The elimination of manual intervention has enable e-procurement to reduce order capturing error rate and improve data integrity.

E-procurement technologies foster automation resulting in more orders being processed with less time. The data has reflected that what took organisations hours to process, as a result of e-procurement automation orders could be concluded within minutes. This has a huge impact on the productivity of an organisation and its capacity to handle high volume orders in less time. The adoption of e-procurement technologies improves organisational internal operations by being more productive and efficient.

Labour costs reduction is one of the tangible benefit that organisations achieves in adopting e-procurement technologies. Even though organisations have not retrenched their labour force, they have increase the volume in term of processing orders without increasing the labour force. The data has also reflected the deployment of staff to

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

other areas of the business resulting in a reduction of the procurement department costs.

The unexpected benefit has been the reduction of fraudulent activities. The elimination of the manual intervention allowing electronic transmission of information between the stakeholders has increase preventative controls. Even though organisations could not quantify the monetary value of these preventative controls, they have seen a drastic reduction in fraudulent cases. The adoption of e-procurement technologies decreases the exposure of organisations to fraudulent orders.

The electronic transmission of procurement information improves the accuracy of data resulting in an improved decision making process. Access to accurate data ensures that management are able to react quickly to the customer demand improving customer relations. The integration of the supplier's and customer's systems as a result of e-procurement adoption has the potential of solidifying the relationship resulting in a willingness to take greater risks when it comes to changing existing business practices. The adoption of e-procurement technologies improves accuracy of information, decision making and customer relations.

The adoption of e-procurement technologies allows organisations to redirect their resources to strategic functions where value can be added. E-procurement encourages internal sales personnel to focus more on increasing sale than capturing orders. Organisation have benefited from the adoption of e-procurement technologies as a result of less time being spent by the procurement personnel on administrative tasks.

7.2.3 INTERNAL SUPPORT

Internal support encompasses of technical support, senior and end-user support as well as financial resources to ensure that e-procurement technologies are adequately implemented. Technical support does not necessary have to be internal as the

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

majority of organisations interviewed utilised third party service providers in implementing e-procurement technologies.

Senior management have to be key sponsors of the change and ensure that appropriate buy-in is obtained from the end-user. Lack of end-user buy-in makes it difficult for any operational changes to occur. Senior management role is not only to be sponsors of the change but they also need to committee financial resources to the adoption e-procurement technologies.

7.3 RECOMMENDATIONS

The recommendations from this research based on the author's analysis of data are as follows:

- For suppliers and manufactures to benefit from the adoption of e-procurement technologies the whole industry must be able to move towards the same direction. E-procurement adoption must not be adopted by few players within the plumbing industry. The appropriate institutional bodies within the plumbing industry should encourage the move towards embracing technology advancements.

- Plumbing professional bodies should advocate the adoption of e-procurement technologies by communicating the benefits to its members in terms of internal operational processes. The adoption of e-procurement technologies by the whole industry will result in a more productive and efficient industry. An industry with an efficient and productive supply chain process will be profitable.

- The adoption of e-procurement technologies requires not only senior support but also financial support. The view by senior management should not be on short term gains but long term strategies that will benefit the industry as a whole.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

7.4 FUTURE RESEARCH

Future research should examine the influence of other factors such as competitiveness, customer service and the size of the organisation. More could also be done on the comparison of the plumbing industry with the FMCG industry. While in the present study the research sample was limited to plumbing suppliers and manufacturers, it can nevertheless function as a point of departure by pointing out the way ahead concerning adoption of technologies by other specialist industries. The usage of qualitative research methodology for this study has limitations, most notably the lack of generalizability to a large population of organisations (Fawcett *et al*., 2011).

7.5 CONCLUSION

The adoption of e-procurement technologies in the plumbing industry is initiated internally by the supplier and manufactures. Customers have limited influence on the direction that suppliers and manufactures take on the adoption of e-procurement technologies. Major benefits exist for the suppliers and manufactures in the adoption of e-procurement technologies that could result in operations being more streamlined. E-procurement adoption results in improved productivity, better costs controls and an efficient and effective supply chain process. This is only possible with the support of senior management, end-user buy-in and allocation of financial resources.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

8. REFERENCES

Aboelmaged, M. G. (2010). Predicting e-procurement adoption in a developing country: An empirical integration of technology acceptance model and theory of planned behaviour. *Industrial Management & Data Systems*, 110(3), 392-414.

Abu-Elsamen, A., Chakraborty, G., & Warren, D. (2010). A Process-Based Analysis of e-Procurement Adoption. *Journal of Internet Commerce*, 9(3), 243-259.

Angels, R., & Nath, R. (2007). Business-to-Business e-procurement: success factors and challenges to implementation. *Supply Chain Management: An International Journal*, 12(2), 104-115.

Archer, N., Wang, S., & Kang, C. (2008). Barriers to the adoption of online supply chain solutions in small and medium enterprises. *Supply Chain Management: An International Journal*, 13(1), 73-82.

Bas, E. (1999). Wholesalers move to e-commerce. *Air Conditioning, Heating and Refrigeration News*, 6(1), 9.

Brandon-Jones, A., & Carey, S. (2011). The impact of user-perceived e-procurement quality on system and contract compliance. *International Journal of Operations & Production Management*, 31(3), 274-296.

Branthwaite, A., & Patterson, S. (2012). In search of excellence: The influence of Peter Cooper on qualitative research. *International Journal of Market Research*, 54(5), 635-658.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Chang, H. H., Tsai, Y., & Hsu, C. (2013). E-procurement and supply chain performance. *Supply Chain Management: An International Journal*, 18(1), 34-51.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *The Institute of Management Science*, 35(8), 982-1003.

Dedrick, J., Xin Xu, S., & Xiaoguo Zhu, K. (2008). How does information technology shape supply-chain structure? Evidence on the number of suppliers. *Journal of Management Information Systems*, 25(2), 41-72.

Devaraj, S., Vaidyanathan, G., & Mishra, A. N. (2012). Effect of purchase volume flexibility and purchase mix flexibility on e-procurement performance: An analysis of two perspectives. *Journal of Operations Management*, 30, 509-520.

Dooley, K., & Purchase, S. (2006). Factors influencing e-procurement usage. Journal of Public Procurement, 6(1), 28-45.

Eisenhardt, K. M. (1989). Building theories from case study research. *The Academy of Management Review*, 14(4), 532-550.

Faloon, K. (2000). News Technology: Overstocking trading sites adds vendors. *Supply House Times*, 42(12), 29.

Fawcett, S. E., Wallin, C., Allred, C., Fawcett, A. M., & Magnan, G. M. (2011). Information Technology as an enabler of supply chain collaboration: A dynamic capabilities perspective. *Journal of Supply Chain Management*, 47(1), 38-59.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Garcia, D., & Gluesing, C. J., (2013). Qualitative research methods in international organisational change research. *Journal of Organisational Change Management*, 26 (2), 423-444.

Gilaninia, S., Mousavian, S. J., Tayebi, F., Panah, M. P., Ashouri, S., Touhidi, R., Nobahar, R., Azizi, N., & Seighalani, F. Z. (2011). The impact of information technology application on supply chain performance. *Interdisciplinary Journal of Contemporary Research in Business*, 3(8), 489-496.

Gordon, W. (2011). Behavioural economics and qualitative research – a marriage made in heaven. *International Journal of Market Research*, 53(2), 171-186.

Javanmardi, M., Khabushani, A., & Abdi, A. (2012). Analysis information technology infrastructure toward supply chain agility in home appliance industry. *Interdisciplinary Journal of Contemporary Research in Business*, 4(3), 416-429.

Lee, H. L. (2004). The Triple-A Supply Chain. *Harvard Business Review*, 82(10), 102-112.

Mahalik, D. K. (2012). Measuring the effectiveness of e-procurement: A case discussion on MCL. *The IUP Journal of Supply Chain Management*, 9(2), 19-30.

McNally, J. (2013). Adjust and adapt. *Supply House Times*, 56(6), 46-50.

Miodonski, B. (2000). Winning the electronic game. *Supply House Time*, 42(12), 56.

Miodonski, B. (2000). Wholesalers have edge over e-commerce firms. *Supply House Time*, 43(1), 49.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Mukhopadhyay, T., & Kekre, S. (2002). "Strategic and Operational Benefits of Electronic Integration in B2B Procurement Processes." *A Journal of the Institute for Operations Research and the Management Science*, 48(10), 1301-1313.

Nissen, M. E. (2006). Incorporating software agents into supply chains: Experimental investigation with a procurement task. *MIS Quarterly*, 30(1), 145-166.

Panda, P., & Sahu, G. P. (2012). E-Procurement implementation: Critical analysis of the impact of success factors on project outcomes. *The IUP Journal of Supply Chain Management*, 9(2), 44-72.

Percy, D. H., & Giunipero, K. C. (2008). Using e-procurement applications to achieve integration: what role does firm size play? *Supply Chain Management: An International Journal*, 13(1), 26-34.

Piotrowicz, W., & Irani, Z. (2010). Analysing B2B electronic procurement benefits: information system perspective. *Journal of Enterprise Information Management*, 23(4), 559-579.

Powell, P. (2007). HVAC barcoding tries to catch up. *The Air Conditioning, Heating, Refrigeration News*, 231(1), 1-34.

Purchase, S., & Dooley, K. (2010). The acceptance and use of e-procurement systems. *International Journal of Logistics: Research and Applications*, 13(6), 459-473.

Quesada, G., Gonzalez, M. E., Mueller, J., & Mueller, R. (2010). Impact of e-procurement on procurement practices and performance. *Benchmarking: An International Journal*, 17(4), 516-538.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Rajkumar, T. (2001). E-procurement: business and technical issues. *Information Systems Management*, 18(4), 52-61.

Sanders, N. R. (2005). IT Alignment in Supply Chain Relationships: A Study of Supplier Benefits. *The Journal of Supply Chain Management*, 41(2), 4-13.

Saunders, M., & Lewis, P. (2012). *Doing Research in Business & Management: An Essential Guide to Planning Your Project.* Essex: Pearson Education Limited.

Sitar, C. P. (2011). E-procurement: A new method for optimizing the purchase process. *Managerial Challenges of the Contemporary Society. Proceedings*, 291-295.

Smart, A. (2009). Exploring the business case for e-procurement. *International Journal of Physical Distribution & Logistics Management*, 40(3), 181-201.

Subramani, M. (2004). How do suppliers benefit from information technology use in supply chain relationships? MIS Quarterly, 28(1), 45-73.

Tai, Y., Ho, C., & Wu, W. (2010). The performance of implementing Web-based e-procurement systems. *International Journal of Production Research*, 48(18), 5397-5414.

Tanner, C., Woelfe, R., Schubert, P., & Quade, M. (2008). Current Trends and Challenges in Electronic Procurement: An Empirical Study. *Electronic Markets*, 18(1), 6-18.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

Teo, T. S. H., Lin, S., & Lai, K. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega: The International Journal of Management Science*, 37(5), 972-987.

Vakharia, A. J. (2002). e-Business and Supply Chain Management. *Journal of Decision Sciences Institute,* 33(4), 495-504.

Vickery, S. K., Droge, C., Seita, P., & Sambamurthy, V. (2010). Supply chain information technologies and organisational initiatives: complementary versus independent effects on agility and firm performance. International Journal of Production Research, 48(23), 7025-7042.

Vickery, S. K., Jayaram, J., Droge, C., & Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of Operations Management*, 21(2), 523-539.

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

9. APPENDIX A: QUESTIONS FOR AN INTERVIEW

Questions related to the influence by buyers/customers

1. Would you classify your relationship with your top ten customers, as close and interactive and why?
2. What are the characteristics that depict a close interactive relationship?
3. Have your organisation implemented e-procurement technologies?
4. From your top ten customers how many have adopted e-procurement technologies?
5. In what ways have they influenced your organisation in implementing e-procurement technologies?
6. Have you experience a decrease in sales as a result of not implementing e-procurement technologies – from customer that have implemented e-procurement technologies?
7. Have you experience an increase in sales as a result of implementing e-procurement technologies – from customer that have implemented e-procurement technologies?
8. What pressure if any have been exerted by your customers to implement e-procurement technologies?

Improvement of internal operations

1. Has your organisation experience any reduction of cost in the following areas as a result of implementing the e-procurement system:
    a. Order capturing?
    b. Order fulfillment?
    c. Price query resolution?
    d. Invoice processing process?

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

2. What impact has e-procurement technologies have on productivity of the work force?
3. List internal operations that have improved as a result of the implementation of e-procurement?
4. In what way have the functions of the work force change as a result of e-procurement technologies?

Internal support

1. What technical capabilities exist within your organisation in implementing e-procurement?
2. To what extent has management invested on training the work force on e-procurement technologies?
3. What influence did the Information Technology Department have on selecting the e-procurement software?
4. What support structure and technical capabilities exist within the Information Technology Department in supporting the e-procurement software?
5. In what way has the top management within your organisation supported the implementation of e-procurement technology?

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.

10. APPENDIX B: CONSENT FORM

Research Consent Form

Adoption and not adoption of e-procurement from the supplier perspective

Luvuyo Mkululi Mgidlana – MBA Student 2012/2013

		Please initial box
1.	I confirm that I understand what the research is about and have had the opportunity to ask questions.	
2	I understand that my participation is voluntary and that I can withdraw at any time without giving reason.	
3.	I agree to take part in the research.	

		Please Initial box	
		Yes	***No***
4.	I agree to my interview being audio recorded.		
5.	I agree to the use of anonymous quotations in the publications.		

I hereby give consent to participate in this survey.

Signature of participant: _____ Date: _____

Signature of researcher: _____ Date: _____

© 2014 University of Pretoria. All rights reserved. The copyright in this work vests in the University of Pretoria.