THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY DEVELOPMENTS (ICT) ON THE PROCUREMENT OPTIMIZATION: CASE STUDY OF NETONE CELLULAR PRIVATE LIMITED IN ZIMBABWE (2018-2019)

SUBMITTED BY
HOPE WISDOM MARONGWE
(B1544308)

A DISSERTATION/THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF COMMERCE (HONOURS) DEGREE IN PURCHASING AND SUPPLY OF BINDURA UNIVERSITY OF SCIENCE EDUCATION FACULTY OF COMMERCE

APRIL 2019

SUPERVISED BY MR MANDAZA
RELEASE FORM

Student number: B1544308
Name of author: Hope Marongwe
Degree title: Bachelor of Commerce (Honours) Degree in Purchasing and Supply
Year submitted: 2019

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Signed………………………………Date…………/………/……..

Permanent address: 203 Phase 4 Eastview, Caledonia, Harare
Phone number: 0777088965/ 0719980290
APPROVAL FORM

The undersigned certify that they read and recommended to the department of Purchasing and Supply, Bindura University of Science Education for acceptance, a project titled “The impact of information and communication technology developments (ICT) on procurement optimization, Case study of NetOne Cellular Private Limited in Zimbabwe (2018-2019),” submitted by Hope Wisdom Marongwe in partial fulfilment of the requirements for the Bachelor of Commerce (Honours) Degree in Purchasing and Supply.

Student’s signature………………………………………..Date……../……../………

Supervisor’s signature…………………………………..Date……../……../………
Mr Mandaza

Chairman’s signature…………………………………..Date……../……../………
Mr Muchabaiwa
DECLARATION FORM

I, Hope Wisdom Marongwe, do hereby declare that this research report is the result of my own work to the extent indicated in the acknowledgements, references and by comments included in the body of the report and that has not been in part or in full for any other degree to any other university.

Signed……………………………….Date…………../…………/………
DEDICATION

This research project is dedicated to my family. Special dedication goes to my parents and my siblings for their support and believing in me over the past four years.
ABSTRACT

NetOne employees are not fully using procurement ICT platforms and this is causing delivery delays, increase in purchasing cycle time, communication barriers and increase in procurement costs. The research was guided by three objectives which seek to determine the impact of ICT developments in procurement. The study seek to investigate the supply chain factors as well as the challenges faced in the adoption and use of ICT in procurement. A descriptive research design was used and a sample size of 36 employees was chosen. Questionnaire were used to collect primary data. The results obtained were computed and presented in forms of tables and figures. Findings revealed that the organization invests in staff development programs and suppliers have got positive attitude towards ICT adoption in procurement. The challenges which are being faced are lack of system integration and high introduction costs. It is recommended that managers should try to integrate ICT applications in their daily operations, encouraging subordinates to make use of them within the organization.
ACKNOWLEDGEMENTS

Firstly, I would like to thank the almighty God for his love and direction over the past three years. The accomplishment of this project would not be possible if it was not for Mr Mandaza guiding me through completion of this research. I appreciate his invaluable support, advice, patience and encouragement.

I would like to express my gratitude to NetOne staff for their support towards the project.

Special thanks to my friends who shared their academic resources. Thank you for being there for me all the sleepless nights.
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ABBREVIATIONS

EDI: Electronic Data Interchange
E-mail: Electronic mail
E-procurement: Electronic procurement
ICT: Information and Communication Technology
NetOne: Netone Cellular Private Limited in Zimbabwe
PRAZ: Procurement Regulatory Authority of Zimbabwe
PTC: Postal Telecommunications
CHAPTER ONE
INTRODUCTION TO THE STUDY

1.0 Introduction
This chapter focuses on the background of the study, the statement of the problem, purpose of the study and research questions. It covers the significance of the study, assumptions of the study, limitation, delimitation and definition of key terms.

1.2 Background of the study
Information and Communication Technology (ICT) has facilitated communication between individuals or groups who are not physically present at the same location (Raymond, 2008). Systems such as telephones, fax and video conferencing are included, as well as more recently computer-based technologies including electronic data interchange (EDI) and electronic mail (e-mail). Introduction of ICT in procurement has resulted in cost reduction, reduced purchasing cycle time, and enhanced budgetary control and improving payment method. The implementation of ICT in the procurement department can enable an organization to develop and accumulate knowledge at stores, ordering process, payment, suppliers and market demands, which in turn influence the organization performance.

Procurement optimization involves a progressive procurement process to purchase goods or services at the best possible cost to meet the needs of the purchaser in terms of quality and quantity, time and location. Procurement as a supply chain function developed significantly over decades. Initially it was purely administrative function until Porter (1980), prompted firms to think of procurement as a strategic function rather than an administrative one.

NetOne Cellular Private Limited (NetOne) is a company owned by the government of Zimbabwe. It was set up in 1996 following the unbundling of Postal Telecommunications (PTC) to provide mobile communication services. It started with 2000 subscribers operating from a containerized mobile switching centre (MSC).
NetOne has grown its subscriber base to 4 million. It now has two mobile switching centres and two packet data centres in Harare and Bulawayo (POTRAZ, 2018). It provides traditional services of voice, internet and data services. Due to technological convergence, the mobile operator is now offering mobile financial services, One Money. NetOne is a key player in the ICT industry, whose network provides the main backbone network for the public sector and the private sector.

NetOne procurement processes are governed by the Procurement Regulatory Authority of Zimbabwe (PRAZ), which was set up by an Act of Parliament, Public Procurement and Disposal of Public Assets Act (Chapter 22.23). PRAZ emphasize transparency, fairness, honesty, cost effectiveness, competition and use of electronic tools in public procurement.

NetOne has applied ICT in procurement optimization but, there is no full utilization of ICT in the procurement process. ICT is being used to send request for quotations, receiving quotations, order processing and invoice approval and payment. Traditional manual systems in procurement are still being used. Computers, e-mails, electronic procurement (e-procurement) software packages, websites and internet are ICTs being used. ICTs such as video conferencing, EDI among others are not being utilized. Procurement officers are failing to collaborate well with suppliers using the new system. This has resulted into major challenges such as delays, communication barriers, and increase in cost of acquiring goods and hence poor procurement process.

1.3 Statement of the Problem
The advanced information and communication technology that NetOne has is causing procurement optimization challenges. The employees are not fully using ICT platforms in their procurement processes. This is causing delivery delays, increase in purchasing cycle time, communication barriers and increase in procurement costs.

1.4 Objectives
1. To determine the impact of ICT developments in procurement.
2. To establish the supply chain factors on procurement.
3. To establish the challenges faced in the adoption and use of ICT in procurement.
1.5 Research questions

1. What are the impacts of ICT developments in the procurement?
2. What are the effects of supply chain factors in adopting ICT in procurement?
3. What are the challenges faced in the adoption and use of ICT in procurement?

1.6 Assumptions of the study

- The respondents will be able to produce relevant answers.
- The researcher assumes that respondents will be aware of ICT developments in procurement and could apply personal experience in the survey.
- The research environment remains constant.
- The responses will be truthful

1.7 Significance of the study

1.7.1 To the researcher
The research will help to broaden the researcher’s knowledge in the area under study.

1.7.2 To NetOne
The research provides information to the NetOne management on what needs to be done to improve e-procurement adoption and how any hindrances can be solved.

1.7.3 To PRAZ
It will help the government through PRAZ to evaluate the relevance of e-procurement in parastatals and benefits of financing in terms the hardware and software needs.

1.7.4 To the University
The research will contribute to the body of knowledge in ICT and will act as a source of reference for studies to be done on ICT in procurement.

1.8 Delimitation
- The study will be limited to NetOne.
1.9 Limitations

- Organizational policies on privacy and confidentiality. The researcher mostly used questionnaire as a means of getting the required information rather than documentary sources.
- Some respondents did not answer the questionnaire because they were busy with their office work. The researcher however, persistently made follow up on questionnaires.

1.10 Definition of key terms

**Adoption:** is the act or process of beginning to use something new or different, or process of giving official acceptance to something (Webster, 2011).

**Information and Communication Technology:** Any technology which supports activities involving the creation, storage, manipulation and communication of information, together with their related methods, management and application (French, 1996).

**Impact:** Research Councils UK (2006) defines impact as the demonstrable contribution that anything makes.

**Procurement optimization**- a progressive procurement process that allows an organization to seek out innovative products or services. An organization with an entrusted purchasing process will enable the sourcing of those innovative goods and services in the hopes of securing a competitive advantage (Wilding, 2004).

**Supply chain:** Consists of the series of activities and organization that materials move through on their journey from initial suppliers to final customers (Waters, 2003).

1.11 Chapter Summary

The chapter introduced the research topic, giving background, statement of the problem, objectives of the study, research questions and the significance of the study. The chapter also sighted the limitations and delimitations of the study as well as the definition of key terms and abbreviations in the research paper.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction
This chapter covers empirical and theoretical literature.

2.1 Theoretical framework
2.1.1 Technology Acceptance Model
Technology Acceptance Model (TAM) has been developed by Davis (1989). It is a research model to predict use and acceptance on information systems and technology by individual users. Technology acceptance model is consistent with Rogers (1983) theory of diffusion innovation where technology adoption is a function of a variety of factors including, relative advantage and ease of use. In TAM model, there are two factors perceived usefulness and perceived ease of use is relevant in computer use behaviors (Davis, 1989). Perceived usefulness is defined as being the degree to which a person believes that the use of a system will improve his performance. Perceive ease of use is defined as the degree to which the prospective user expects the target system to be free of effort.

Technology acceptance model attempts not for prediction but also for explanation to help researchers and practitioners identify why a particular system may be unacceptable and pursue appropriate steps.

2.1.2 Technology Diffusion Theory
Technology diffusion theory is the common lens through which theorists study the adoption and development of new ideas. Diffusion is defined basically as the process by which an innovation is adopted and gains acceptance by members of a community. The diffusion theory represents a complex number of sub-theories that collectively study the processes of adoption. The diffusion theory done by Rogers (1995) have four elements which are;
• Innovation: an idea, practices or object perceived as new by individuals or group of adopters.
• Communication channels: means by innovation moves from one individual to the next or group to group.
• Time: the non-spatial interval through which diffusion event takes place.
• The events include: innovation diffusion process, relative span of time for the individual or group to adopt the innovation and social system: a set of interrelated units that are engaged in joint problem solving activities to accomplish the goal.

Rogers (1995) also came up with the perceived attributes theory that assumes that innovation bears the following characteristics;
• Relative advantage: degree in which an advantage is perceived as better than the idea it supersedes (Davis, 1989).
• Compatibility: degree that an innovation is seen to be in consistent with existing values and norms.
• Complexity: the degree in which an innovation may be experienced on a limited basis.
• Observability: the degree to which the results of innovation are visible to others.

The easier it is for individuals to see results of an innovation, the more they are likely to adopt it (Rogers, 1995).

Although the process is not limited to these perceived attributes, the elements are helpful in formulating questions for potential adopters in better understanding what factors make adoption possible or desirable. Endogenous growth theory how indicates that the rate of technological progress, and hence the long-run rate of economic growth, can be influenced by economic factors which will curtail technology adoption in procurement as technology is seen as being costly. It starts from the observation that technological progress takes place through innovations, in the form of new products, processes and markets, many of which are the result of economic activities (Lieberth, 2007).

Technology revolution has impacted on purchasing; the drivers for change in purchasing function must include the objectives of eradicating paper transactions to a
secure system that facilitates procure to pay as an objective of a world class procurement which is seen to enhance the performance of the procurement function (Lysons, 2012). The Technology Diffusion theory is important in guiding the firm to initiate change and adopt technologies in procurement in the shift towards world class procurement.

2.1.3 Technology Organization Environment (TOE) model

The TOE framework was developed by Tornatzky and Fleischer (1990). It identifies three aspects of an enterprise’s context that influence the process by which it adopts and implements a technological innovation: technological context, organizational context, and environmental context. Starbuck (1976) noted that technological context describes both internal and external technologies relevant to the organization. This includes current practices and equipment internal to the organization, as well as the set of available technologies external to an organization. To elaborate further, organizational context refers to descriptive measures about the organization such as scope, size and managerial structure. Environmental context is the arena which an organization conducts its business that is, its industry, competitors, and dealings with the government.

This framework is consistent with Diffusion of Innovation theory, in which Rogers (1995) emphasized individual characteristics, and both internal and external characteristics of the organization as drivers for organizational innovativeness. These are identical to the technology and organization context of the TOE framework also includes a new and important component, environment context. The environment context presents both constraints and opportunities for technological innovation. The major snag of TOE is that some of the construct in the adoption predictors are assumed to apply more on large organizations, where clients are sure of continuity and less complaints, than to small or medium organizations. However, integrating with other models such as TAM, with each adoption predictor offering large number of constructs than the original provides richer theoretical lenses to the understanding of adoption behavior.
2.3 Empirical Studies

In order to meet today’s operating challenges, managers are turning to adopt ICT in order to improve internal efficiencies by lowering costs and increasing productivity. The executives are implementing scalable communication infrastructures to enhance economic development, draw new customers and businesses, and above all, offer excellent services to consumers (Abouzeedan & Busler, 2002). According to Deputy Chief Secretary to the President and Cabinet manual systems are a cause of key inefficiencies in regulation and operations of the function in Zimbabwe. ICT needs to be adopted to ensure proper functioning of the procurement system. This does not only involve computerization of the system but scaling communication technology. With globalization and internet connectivity, there is need to upscale the function in Zimbabwe.

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**Figure 2.1: Technology Organization Environment (TOE) model**

- **External task environment**
  - Industry characteristics and market structure
  - Technological support infrastructure

- **Organization**
  - Formal and informal linking structures
  - Communication process

Technological innovation decision

Technology
- Availability
- Characteristics

**Source:** Tornatzky and Fleischer (1990)
The procurement process has had many ambiguities in the recent past due to the long and tedious processes and lots of paperwork (Rwoti, 2005). The adoption and application of ICT in the procurement process has reduced this through embracing online methods of carrying out the procurement process. Caldwell and Roehrich (2009), observe that the use of online forms, emails, new software technologies in evaluating and making price comparisons has made this process efficient. More so, such form of ICT adoption ensures transparency, accountability as well as reduction in errors and omissions. The adoption of these ICT applications also has an overall impact on the organization in that it will reduce costs within the procurement department. Another advantage is that it reduces errors in the procurement process thus ensuring maximum output of the organization at the lowest costs possible.

The potential of information and communication technology is realized through its integrated use in the various core and support functions of an organization as well as with external business partners. Kearney (2004), proposed that ICT in procurement significantly influence the success of a company. The priority of ICT is to provide support in the creation of process efficiency and expenditure transparency as well as achieving reductions in the purchasing price. ICT makes an important contribution to successfully carrying out the procurement function. ICT interacts with procurement to improving quality of services while its absence or use of inappropriate means can act as a barrier to change and may lead to deterioration of the purchasing function.

ICT adoption in procurement function is understood to benefit businesses by reducing operation costs, helping the improvement of geographically discrete markets and improving synchronization between cooperating parties (Sigala, 2003). These benefits have been evaluated in a number of studies on large and medium-sized firms. However, the mere adoption of ICT in procurement does not ensure superior performance because organizational resources will be committed into collaborative process capabilities (Ellram, 2001).

According to research conducted by Leenders and Fearon (1997) companies realize far less benefits of ICT than expected. This affirms that most firms merely achieve communication improvements and may even suffer from increased competition from companies in the same industry. Patterson and Grimm, (2003) have analyzed why some
companies successfully adopt ICT in procurement while others do not succeed. Achieving ICT fit in procurement relies on planned choices and organizational capabilities (for example innovation capability) and market characteristics.

Schau, (2003) explains that ICT adoption in procurement has been backed as a new strategic view of supply chain management. The innovation of employing ICT in procurement systems can create value for enterprises through utilizing ICT enabled resources on supply chain management. Previous studies have focused on the benefits of ICT on supply chain performance.

The biggest difficulty of embracing ICT and its consequent application on procurement processes is concurrent to high introduction costs for new solutions. Tanner (2006) in his study on Australian companies in 2005, results indicated that 61.3% of the companies under study cited high initial costs as the major challenge for ICT adoption in procurement processes. Tim (2005) findings were that many companies in Europe mentions that the benefit and the potential of new ICT solutions are difficult to appraise. This should lead the solution providers to figure out that the challenge is to give main concern to cost or benefit considerations and, in relation to this, to transparent, open communication.

Another challenge that impedes the effectiveness of ICT adoption is linked to integration of all suppliers and customers alike to the procurement process (Tim, 2005; Gebuer, 2010). Findings from a study by Tanner indicate that 54.8% of companies studied describe the slow integration of suppliers to the procurement system as one of the main difficulties in effectively using appropriate ICT solutions. Poor quality of master data also remains an ongoing issue as most organizations in Africa find this a greater impediment in their procurement systems.

Angeles and Nath (2007), in particular explored the challenges to ICT adoption in procurement and identified three important issues, namely lack of system integration and standardization, and difficulty of integrating e-commerce with other systems. A number of recent studies have also looked into difficulties faced by firms in launching ICT in procurement. Huber (2004) found that concerns over security and confidentiality
of the data needed to be exchanged in electronic environments was perceived as among the barriers to implementation of electronic procurement.

Beth (2003) sights lack of employee competency as a challenge in ICT adoption on procurement processes. He affirms that ERP systems perfectly provide the procurement management and the management itself with the opportunity to produce steadfast, consistent, and timely information necessary for attainment of organizational goals. In his study he affirms that procurement staff must be competent enough to use the applications of software that offers the organization management skills to manage their activities for example, distribution chain and value addition in a company.

Among the challenges the organization will face as a result of adoption of the new system will include cost. The organization will incur high costs in the acquisition, installation and training on use of the new system. Costs will also extent to outsourcing for skilled personnel for system maintenance as well as continuous upgrade to ensure maximum output.

Another major challenge will be system complexity. The complexity of the new system will mean that the organization’s employees need to continuously receive training at intervals to ensure that any new developments within the system are passed on to them (Gebuer, 2010; 2011). Thus, the organization will stretch its costs to these continuous training which will be mainly outsourced.

Mainje (2011) carried out a research on factors that affect adoption of e-procurement. The research used a descriptive research method and a sample of 35 respondents. The researcher used a questionnaire and focus group discussion to obtain data of the views on traditional and e-procurement adoption. The results reviewed that lack of knowledge and skills on e-procurement are a barrier to e-procurement adoption with some of the employees resisting change. The author discovered that Zimbabwe National Planning Council was receiving inadequate financial and technical support from the government in order to adopt the most desired ICT.
2.4 Research Gap
The extent of ICT adoption in procurement processes and its effects on organization performance is still not clear. These studies were conducted in other countries such as Kenya among others. However, comparatively little research has been done about ICT adoption and success in procurement in the service sector in Zimbabwe. The researcher intends to fill this research gap.

2.5 Chapter Summary
The chapter reviewed literature which is adoption and use of ICT on procurement optimization. Therefore it assisted the researcher to come up with sound suggestions so as to fill gaps in ICT developments on procurement optimization. The next chapter discusses the research methodology.
CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction
This chapter highlights the study variables, and research design. It will also cover data source, the study population, sample size determination, sampling technique, and construction of research instruments, validity and reliability of the instruments, methods of data collection, data analysis and ethical considerations of the study.

3.1 Conceptual Framework
A conceptual framework was developed to show the relationship between dependent variable and independent variables. The conceptual framework will look on ICT adoption on procurement process of an organization as the dependent variable. The ICT applications in procurement process, individual factors, supply chain factors and challenges of ICT adoption will be viewed as independent variables. The relationship between variables is shown below.

Figure 3.1 Conceptual framework

![Conceptual Framework Diagram]

Dependent variable
ICT adoption and use on procurement process

Independent Variables
- ICT applications on procurement process
- Individual factors: Management emphasis, Human source competency and
- Supply chain factors: Obstacles, Level of collaboration, Nature of relationship
- Challenges of ICT adoption: Cost, Complexity

3.2 Research design
The researcher adopted a descriptive research design in the study. This design was used because the researcher wanted to concentrate on specific area that would be able to
provide more accurate results. Descriptive research design was used as it allows the researcher to cover a reasonable sample of respondents, that is representative of the total population under study and also enables the researcher to organize data in a meaningful way (Kothari, 2004). Descriptive research design was used because it enables the research objectives to be accomplished by carrying out a field survey using questionnaires as major instrument. This design was appropriate because it is considered suitable for gathering qualitative information and generating appropriate conclusions with respect to the research questions (Mugenda, 2003).

3.3 Target population

The target population for this research was the total number of employees in the procurement department, finance department, stores department and ICT department presented in table 3.1 below.

Table 3.1: Target population frame

<table>
<thead>
<tr>
<th>Department</th>
<th>Target population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement</td>
<td>15</td>
</tr>
<tr>
<td>Stores</td>
<td>15</td>
</tr>
<tr>
<td>Finance</td>
<td>33</td>
</tr>
<tr>
<td>ICT</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
</tr>
</tbody>
</table>

Source: Primary, 2019

The list of staff was drawn from employee records. Access to the records was negotiated since the records were confidential. This made it easier to get adequate and accurate information necessary for research. Apart from that, population selected was considered to have a higher level of information disclosure. The target population was equal to 90 employees.

3.5 Sampling Technique
Stratified sampling method was used to obtain a sample of the respondents. This technique was ideal because it gave the respondents at all levels in the organization an equal opportunity to participate in the study without bias (Kothari, 2004). This method was justifiable for this research because it allowed equal chance for all staff members who use ICT in procurement from all levels within the department to participate equally as they were selected randomly from each sub-department within the organization. Neuman (2003) argues that the main factor considered in determining the sample size is the need to keep it manageable enough. The choices for this technique enable the researcher to derive detailed data at an affordable cost in terms of time, finances and human resource (Mugenda and Mugenda, 2003).

3.4 Sample size

In line with Fliess (2000), a sample size of 36 employees out of the total population was chosen. The sample size is presented on the table 3.2 below.

<table>
<thead>
<tr>
<th>Department</th>
<th>Target population</th>
<th>Sample</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement</td>
<td>15</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Stores</td>
<td>15</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Finance</td>
<td>33</td>
<td>13</td>
<td>13.2</td>
</tr>
<tr>
<td>ICT</td>
<td>27</td>
<td>11</td>
<td>10.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>36</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

Source: Primary data, 2019

This sample was a mixture of top managers, middle managers, officers and clerks. This representative sample was approximately 40% of the total population. Arkava et al (1983), also highlighted that a sample is drawn from a target population and it is representative when it accurately reflects the distribution of relevant variables in target population if it is more than 30%.

3.6 Research instruments

The researcher used a questionnaire with a Likert scale as the primary data collection instrument. According to Kothari (2004), a self-administered questionnaire is the only
way to elicit self-report on people’s opinion, attitudes, beliefs and values. The questionnaire was divided into sections representing the various variables adopted for study. Each section included close structured questions and open ended questions which sought the views, opinions, and attitudes from the respondents which might not have been captured by the researcher. The questions were designed to collect qualitative data. The questionnaire were administered through drop and pick method to the managers or equivalent employees.

3.7 Data source

3.7.1 Primary sources

Primary sources are original sources from which the researcher directly collects data that have not been previously collected. According to Moorhead and Griffin (1990) primary sources provide direct description of the study by the person who actually observed or witnessed the occurrence of an event or carried it out. Primary data was collected by way of questionnaires. Primary data was useful in that it enables the researcher to collect data which was specific for the research and it becomes possible to capture the changes occurring in the course of time. The danger of missing target was minimised since it also enables the researcher to deal with the actual variables and factors that are involved in the research.

3.7.1.1 Questionnaire

The researcher used a questionnaire because it presents information in writing. The researcher carefully worded and ordered questions to ensure that they are simple, direct and unbiased. Researcher chose questionnaire because it saves time and cheap way of surveying a large cross section of people. The researcher guided participants along lines of thought with the regard to the impact of ICT on procurement optimization. Furthermore, the researcher used self-administer questionnaires which offered respondents the flexibility of filling in the questionnaires at their own convenient times and had enough time to think about their responses.
3.8 Validity and reliability of the instrument
The relevance of this research work was adequately considered in the instrument used in the data collection. The tool used was reliable and applicable to this research. Specific and appropriate questions were designed.

3.9 Data collection procedure
Permission was sought from the NetOne to carry out research. A cover letter accompanied the questionnaire which emphasized the issue of confidentiality of information. The questionnaires were delivered and collected after three days.

3.10 Data analysis, presentation and discussion
This include analysis of data to summarize the essential features and relationships of data in order to generalize from the analysis to determine patterns of behavior and particular outcomes. Different method of data presentation were used to give a clear picture of the trends in the data and the study offered the data in descriptive forms of simple tables, graphs and figures. Tables were used because they are easy to comprehend and interpret. Graphs such as bar graphs and pie charts were also used to present data. Also figures were made to show relationships between variables for better clarification and this improved effective interpretation of data and were also very important in making comparisons. The study followed the procedure of analyzing data qualitatively as described by (Creswell, 2003).

Data analysis is a process of bringing order, structure and interpretation to the mass of data collected. The process as outlined by De Vos (2005), includes examining and categorizing in order to address the research problem. The use of excel and SPSS statistics 20 was therefore used to analyze qualitative data using question by question analysis in order to produce informative results. This was in order to gain initial analytical framework as well as linked the research into an existing body of knowledge. Lastly, this highlights the overall procedures in organizing, describing and analyzing data collected pertaining to this subject of study.
3.11 Ethical considerations

The rights of participants were protected. Selection of respondent was voluntary and respondents were also kindly requested to respond to the questions. The information obtained was reserved confidential by the researcher. Questions likely to raise emotions were avoided. In addition, respondents were notified the aims and anticipated benefits of the study. Prior permission was also sought from NetOne to collect data.

3.12 Chapter summary

The chapter emphasized on the conceptual framework, research design, research population, research sample, sources of data, validity and reliability, data collection techniques and a plan for data presentation analysis, highlighting the merits and demerits for using such methodologies.
CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

In this chapter data analysis, discussions and research findings are covered. The aim of the study was to investigate the impact of ICT adoption in the procurement optimisation in NetOne.

Table 4.1: Response rate and non-response rate

<table>
<thead>
<tr>
<th>Category</th>
<th>Questionnaire distributed</th>
<th>Number of responses</th>
<th>Response rate %</th>
<th>Non response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement</td>
<td>6</td>
<td>6</td>
<td>100%</td>
<td>-</td>
</tr>
<tr>
<td>Stores</td>
<td>6</td>
<td>6</td>
<td>100%</td>
<td>-</td>
</tr>
<tr>
<td>Finance</td>
<td>13</td>
<td>8</td>
<td>62%</td>
<td>38%</td>
</tr>
<tr>
<td>ICT</td>
<td>11</td>
<td>10</td>
<td>91%</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>30</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: Primary data, 2019

According to Gay (1995) a response rate of 50 percent is adequate and therefore that of 83 percent was also adequate for data to be analysed and interpreted.

4.2 Demographic characteristics

4.2.1 Gender of respondents

The respondents were asked to show their gender, this was expected to guide the researcher on the conclusions regarding the degree of congruence of responses with the gender characteristics. The results are shown on figure 4.1 below.
Figure 4.1 Gender of respondents

Source: Primary data, 2019

4.2.2 Terms of employment
The respondents were asked to show their terms of employment either temporary, contract or permanent. The findings are presented on figure 4.2 below.

Figure 4.2: Terms of employment

Source: Primary data, 2019

4.2.3 Highest attained educational level
Study participants were requested to reveal their highest accomplished level of education. The results were computed and arranged on figure 4.3 below to reveal the difference.
Indications from the survey were that employees had attained at least a diploma in a particular professional course. Since the learning of ICT is a prerequisite for attaining any professional qualification in Zimbabwe, chances are that all respondents have some knowledge about ICT and could use its elements in procurement process without difficulty. Lewis and Roehrich (2009) indicated that experience and ability to handle the new system as well as to quickly adapt to the new system should be among the factors the human resource department should put into consideration when making their selection.

4.2.4 Job level of respondents
The respondents were asked to show their job levels. Results were computed and presented in figure 4.4 below.
Findings reveal that respondents from all levels in the hierarchy of the organization have participated in the study. This means that different views and experience on the study were provided.

### 4.2.5 Training in ICT applications and usage

An investigation was done to determine if employees were given formal training on ICT use in procurement process. Results obtained were computed and presented in table 4.2 below.

#### Table 4.2: ICT training

<table>
<thead>
<tr>
<th>Response</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Findings revealed evidence of staff development in form of training on all permanent employees. This shows commitment towards embracing the modernity of procurement systems through staff development initiatives. Most of the respondents agreed having been formally trained on ICT applications. This means that most of the respondents have the significant system knowledge to handle e-business transactions.
These findings agree with Wanjiru and Abdalla (2015) who note that vital ICT skills are essential for the integration of modern technology with procurement processes. Ngugi and Mugo (2010) also indicate that success of ICT adoption in procurement is heavily dependent upon skills acquired by users which include training in ICT components usage. From the study nine employees who are yet to be trained are new members of staff who are either temporal or on contract.

4.2.6 Extent of work using ICT devices

A survey was done to ascertain frequency and prevalence of ICT usage in procurement process. Results obtained were computed and presented in figure 4.5 below.

**Figure 4.5: Extent of work using ICT devices**

![Figure 4.5](image_url)

**Source: Primary data, 2019**

The extent of over 80 percent usage of ICT in procurement is likely to save processing time for orders and communication with customers and suppliers. Quayle (2005), affirms that ICT integrated procurement solution offers the company to reduce direct cost through more efficiency in the process because staff time spent in searching and ordering products. Chaffey (2002) also argued that companies can make savings by reducing inventory level because faster purchase cycle time can be achieved through ICT based procurement and it consequently reduce the need for more material in stock.
4.3 Applications in procurement process

4.3.1 ICT applications used in procurement

An investigation was done to identify the ICT systems used in the procurement process in the organization and how they have eased the process. Results attained were computed and presented in table 4.3 below.

Table 4.3: ICT systems used in procurement process

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic procurement system</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Electronic Mail</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Websites</td>
<td>18</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Primary data, 2019

The use of these ICT application systems, that is, e-procurement, websites and e-mail have been supported by Caldwell (2009). He affirms that, the use of online forms, emails, new software technologies in evaluating and making price comparisons has made this process efficient and at the same time ensuring transparency and accounting as well as reduction in errors and omissions.

4.3.2 ICT tools usage in procurement processes in the organization

A survey was done to establish the extent to which ICT was used in the procurement process in their organization. Findings obtained were computed and presented in table 4.4 below.
Table 4.4: ICT employed in procurement process

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need identification</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>2.6000</td>
<td>.93218</td>
</tr>
<tr>
<td>Need specification</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.5000</td>
<td>.98027</td>
</tr>
<tr>
<td>Sourcing Options</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.6333</td>
<td>.76489</td>
</tr>
<tr>
<td>Evaluations</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.3000</td>
<td>.95231</td>
</tr>
<tr>
<td>Order awarding</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.6000</td>
<td>.81368</td>
</tr>
<tr>
<td>Delivery</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>2.0667</td>
<td>1.04826</td>
</tr>
<tr>
<td>Expediting</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.3333</td>
<td>.99424</td>
</tr>
<tr>
<td>Invoice approval and payment</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.5000</td>
<td>.82001</td>
</tr>
</tbody>
</table>

Source: Primary data, 2019

Due to a faster, efficient and effective manner with few blunders and cost savings, ICT is being used mostly in the process of sourcing, order awarding, need specification and invoice approval and payment. Reduction of costs is connected with less paperwork, which interprets into reduced errors and a much effective purchasing process. ICT is making purchasing process easier as well as having a positive effect on the whole purchasing cycle. Use of ICT in procurement processes introduces new central controls to ensure greater consistency, improve procurement efficiency and hence union with other departments.

4.3.3 Procurement performance

The respondents were asked to indicate the extent to which they agreed with the procurement performance in relation to ICT system application. The results were computed and presented in table 4.5 below.

Table 4.5: Procurement performance

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement performance on cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage.</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.6000</td>
<td>0.77013</td>
</tr>
</tbody>
</table>

Source: Primary data, 2019
The respondents agreed to a larger great extent that performance measurement of the purchasing function yields benefits to organizations such as cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage with. Kearney (2004), affirms that ICT in procurement significantly influence the success of the company. He also said that the priority of ICT is to provide support in the creation of process efficiency and expenditure transparency as well as achieving reductions in the purchasing price.

4.4 ICT and procurement process challenges

An investigation was done to establish the frequency and prevalence of the challenges faced in the adoption and use of ICT in procurement. The results obtained were computed and presented in table 4.6 below.

**Table 4.6 Challenges in implementing ICT for procurement processes**

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High introduction cost</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>3.2667</td>
<td>1.08066</td>
</tr>
<tr>
<td>Suppliers were slow to link up with procurement system</td>
<td>18</td>
<td>1</td>
<td>4</td>
<td>3.5000</td>
<td>1.15045</td>
</tr>
<tr>
<td>Lack of user- acceptance</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>2.9333</td>
<td>.98027</td>
</tr>
<tr>
<td>Lack of system integration and standardization</td>
<td>22</td>
<td>1</td>
<td>4</td>
<td>2.9545</td>
<td>1.17422</td>
</tr>
<tr>
<td>Lack of employee competence</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>1.6000</td>
<td>.96847</td>
</tr>
<tr>
<td>Employee resistance to new solutions</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>1.4667</td>
<td>.73030</td>
</tr>
</tbody>
</table>

*Source: Primary data, 2019*

The respondents agreed to a greater extent that suppliers’ slowness to link up with the procurement system is a major challenge in adopting and use ICT in procurement. Suppliers are faced with different e-procurement platforms, arrangements and problems with the functionality of the system. This goes in line with Angeles and Nath (2007), who stated that most suppliers will be kept out of business due to the lack of necessary requirements to use the new system as well as the cost involving the acquiring of the new system and training costs as well.
The respondents agreed to a great extent that lack of system integration and standardization is a challenge in adopting ICT in procurement. This was supported by Angeles and Nath (2007) who discovered the challenges to ICT adoption in procurement and identified three important issues, namely lack of system integration and standardization, and difficulty of integrating e-commerce with other systems.

The findings shows that high introduction cost and lack of user acceptance were other challenges being faced to a great extent. Where use of IT in procurement is not mandated, and then take up by contracting authorities appears to have been slow. This can be attributed to the costs of re-organizing internal systems and low awareness of the advantages. Gebuer (2011) affirms that the complexity of the new system will mean that the organization’s employees need continuously receive training at intervals to ensure that any new developments within the system are passed on to them.

The challenge of lack of employee competency and employees’ resistance to new solutions were ranked on moderate extent and no extent.

4.5 Attitude of suppliers on ICT adoption.

A survey was done to find the attitude of suppliers on ICT adoption. Results obtained were computed and presented on figure 4.6 below.

Figure 4.6 Attitude of suppliers on ICT in procurement

Source: Primary data, 2019
The data collected indicates a positive supplier attitude among the suppliers on the company ICT adoption in procurement. Some of the respondents indicated to a lesser extent that suppliers had a negative attitude on ICT adoption in procurement optimization.

4.6 Discussion

An important research finding is that the impact of ICT adoption on procurement processes mainly refers to operational cost reductions. These results are in line with the results of Sigala (2003), that ICT adoption in procurement function is understood to benefit businesses by reducing operation costs, helping the improvement of geographically discrete markets and improving synchronization between cooperating parties. Ellram (2001), contested these results elaborating that the mere adoption of ICT in procurement does not ensure superior performance because organization resources will be committed into collaborative process capabilities.

Another finding was that, NetOne is facing a challenge of lack of system integration. These results are supported by the findings from the study of Tanner (2006). He indicated that 54.8% of companies studied describe the slow integration of suppliers to the procurement system as one of the main difficulties in effectively using appropriate ICT solutions.

Added to that, high introduction costs are also being faced when trying to implement new ICT developments in procurement. This is in line with the results of Tanner (2006), which 61.3% of the companies under the study cited high initial costs as the major challenge for ICT adoption in procurement processes. This is supported by results of Tim (2005), which many companies in Europe mentions that the benefits and potential of new ICT solutions are difficult to appraise.
4.7 Chapter summary
The chapter looked at data presentation, data interpretation and analysis. Analysing the results, it showed that ICT developments have impacted procurement optimization of NetOne. The next chapter will present the research summary, conclusions and recommendations.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter presents summary of findings, conclusion and recommendations.

5.2 Summary of research findings
The main research questions sought to find the impact of ICT on procurement optimization, the effects of supply chain factors on procurement process and challenges faced in ICT adoption and use of ICT in procurement. Findings from this research were:

➤ The research found that most of the respondents recognized that ICT applications like EDI, email and e-procurement were in use in the organization and had influenced the procurement optimization.

➤ The investigation has shown that operational compatibility and the level of collaboration are two of the factors that play a determinant role in the adoption of e-business and its impact. The study found that a large percentage of the suppliers have positive attitudes towards the adoption of ICT in procurement. Suppliers are willing to adopt and use ICT in their companies as they are aware of its advantage in procurement.

➤ This research focused on establishing challenges present to NetOne while adopting and using ICT in procurement optimization. The study found out that for ICT to be easily implemented, the information systems need to be set up by all participants in the supply chain. Investment will have to be made on structures and processes harmonized and standardized. One of the challenges found in the research was that of high introduction costs for new solutions such as access to enterprise resource management systems and bandwidth that are key adopting e-business. In this way, organizations keen to implement e-procurement should therefore invest into structures and processes necessary for ICT adoption.
5.3 Conclusion
Past studies of ICT adoption have focused more on identifying the expected benefits, rather than on assessing the exact impact of the adoption. Against this background, the researcher concluded that:

- From the study it is also clear that the adoption of ICT applications is not exclusively a matter of resources. On the contrary, operational compatibility and the level of collaboration are two of the factors that play a determinant role in increased ICT adoption and impact.
- Subsequently, managers and practitioners should be prepared to put emphasis on developing their relationships with their suppliers preparatory to implementing common ICT investments. In addition, they should try to increase partners’ commitment to use these applications.
- As the study revealed, increased impact on procurement processes results from higher intensity of use and not necessarily from the adoption of more complex applications. Managers should therefore try to integrate ICT applications in their daily operations, making e-business part of their work.

5.4 Recommendations
From the findings of this study the following are the researcher’s recommendations that NetOne has to adhere to in order to maximize benefits of ICT in procurement optimization.

- Paperwork must be reduced and use modernized e-procurement systems.
- Training workshops must be continuously provided to enhance skills and knowledge level on ICT in procurement.
- Managers should try to integrate ICT applications in their daily operations, encouraging subordinates to make use of them within the organization.
- Senior management commitment is needed when formulating the policies and strategies to put ICT in procurement optimization initiative in place.
- When upgrading ICT in procurement suppliers and customers must be involved also.
5.5 Suggestions for further studies

There is scope for further developments of this analysis. The study was limited to NetOne. The researcher would thus recommend for further study in the topic of ICT adoption impacts on procurement within organizations. Furthermore, there is an urgent need for understanding the management of the system once it is installed and up running.
REFERENCES


Gul, H., 2010. Modernizing public procurement and creating an independent public procurement regulation, s.l.: s.n.


APPENDIX A

Bindura University of Science Education
P.O Box 1020
Bindura

21/02/2019

Human Resources Manager
NetOne Cellular Private Limited
1 Jason Moyo Kopje Plaza Building
Harare

Dear Sir/Madam,

Ref: Request for permission to carry out research in your organization

I am an undergraduate student at Bindura University of Science Education. It is a requirement of the university that all students must carry out research projects in partial fulfilment of the degree’s requirements. I am therefore kindly seeking for permission to carry out research in your organization on the “The impact of Information and Communication Technology developments on the procurement optimization of an organization: Netone Cellular Private Limited”. The information provided will be used exclusively for academic purposes.

Your assistance will be greatly appreciated.

Yours sincerely

Hope Marongwe.

wismaron@gmail.com
0719980290/0777088965
APPENDIX B

QUESTIONNAIRE

Section A: Personal information (Please tick where appropriate)

1. Gender:
   - Female [ ]
   - Male [ ]

2. Terms of employment:
   - Temporary [ ] Permanent [ ] Contract [ ]

3. Highest Attained Educational level:
   - Secondary [ ] Diploma [ ] Degree [ ] Post graduate [ ]

4. What is your job Level?
   - Top Management [ ] Middle level [ ] Supervisor [ ] Operative [ ]

Section B: ICT applications in procurement process
(Please rank by placing a tick in the appropriate place)

5. Do you have any formal training in ICT applications on procurement process?
   - Yes [ ] No [ ]

6. To what extent does your work involve the use of ICT devices?
   - No extent [ ] A little extent [ ] Moderate extent [ ] Great extent [ ] Very Great extent [ ]

7. What are the ICT systems used and how they have eased the procurement process in your organization?
   - ……………………………………………………………………………………………………………………………
   - ……………………………………………………………………………………………………………………………
   - ……………………………………………………………………………………………………………………………
8. Rate the extent to which ICT is employed in the following procurement process in your organization?

1= No extent, 2= Moderate extent, 3= Great extent and 4= Very great extent

<table>
<thead>
<tr>
<th>Description</th>
<th>No extent</th>
<th>Moderate extent</th>
<th>Great extent</th>
<th>Very Great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Assessing the needs of procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2 Specification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3 Sourcing options</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4 Evaluations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5 Order awarding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6 Delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7 Expediting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A8 Invoice approval and payment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section C: ICT and procurement performance

9. To what extent do you agree with the procurement performance in relation to information system application?

1= No extent, 2= Low extent, 3= Moderate extent and 4= Great extent

<table>
<thead>
<tr>
<th>Description</th>
<th>No extent</th>
<th>Low extent</th>
<th>Moderate extent</th>
<th>Great extent</th>
<th>Very Great</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement performance on cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section D: Challenges in implementing ICT for procurement processes
10. What challenges does your company face in implementing ICT in procurement processes?

1= Not at all, 2= Moderate extent, 3= Great extent, 4=Very great extent

<table>
<thead>
<tr>
<th>Description</th>
<th>Not at all</th>
<th>Moderate extent</th>
<th>Great extent</th>
<th>Very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High introduction costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppliers were slow to link up with the procurement system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of user-acceptance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of system integration and standardization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of employee competency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee resistance to new solutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. In your opinion what are the possible solutions to challenges faced by your company in implementing ICT for procurement processes?

12. What is the attitude of your suppliers on ICT adoption on procurement optimization?

1. Positive ( )
2. Negative ( )

13. What type of relationships does your organization currently have with its suppliers?

1. Close ( )
2. Moderate ( )
3. Distant ( )
4. No Relation ( )

Thank you for your cooperation