DETERMINANTS OF BUSINESS INFORMATION SYSTEMS ADOPTION IN BUSINESS OPERATIONS IN KENYA: A CASE OF SELECTED TEA COMPANIES IN NANDI COUNTY

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D53/OL/1010/02

A RESEARCH REPORT SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTERS IN BUSINESS ADMINISTRATION OF THE SCHOOL OF BUSINESS OF KENYATTA UNIVERSITY

MAY 2013
DECLARATION

I hereby declare that this research report is my original work and has never been submitted for any other award. No part of this work may be reproduced or transmitted in any other form without prior permission of the author/Kenyatta University.

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DECLARATION BY SUPERVISOR

I confirm that this Research Report was carried out by the candidate under my supervision and has been submitted for consideration with my approval.

Signature ........................................ Date........................................
Dr.DAVID M.NZUKI
DEPARTMENT OF MANAGEMENT SCIENCE

SIGNATURE: ___________________________ DATE: ______

CHAIRPERSON, DEPARTMENT OF MANAGEMENT SCIENCE
ABSTRACT

Innovation of new business information systems or existing information systems in organizations in Kenya has become a necessity rather than a norm. Tea firms in India, Sri Lanka and other global tea producing countries are going through major challenges in doing business namely, rising labor costs, price volatility on world markets, revaluation of the Kenyan shillings vis-à-vis the US dollar and production outpacing exports. To survive in the global economy, stringent methods must be employed or embraced to ensure doing business becomes sustainable. The researcher explored the factors that influence business information system adoption. Many theories and several empirical studies had been carried out in this area of study, but not necessarily in the rural setup of the tea industry in Kenya, and in particular targeting only large scale tea firms and multinationals (MNC). The study was done in Nandi Hills Town of Nandi County, in selected large scale firms and MNC. Primary data was collected using structured questionnaires supplemented with both face-to-face interviews just to ensure the response rate is adequate. The sample of 67 respondents was selected from senior managers, middle managers and supervisors who have an in depth knowledge in the area of study, and this was found to be advantageous to the researcher as this worked positively towards advancing the course of the study. Logistic regression was used to model and analyze the data, employing Statistical Package for Social Sciences (SPSS), plus descriptive statistics were used. This choice was made because the dependent variable was dichotomous in nature and the expectation was either adoption or otherwise none of it. The findings demonstrated that large and multinational tea firms generally embraced BIS. This can be attested to the findings that explained the logit model. The Nagelkerke’s $R^2$ was lowest at 0.519 (for management technical orientation) and the highest at 0.815 (for environmental factors) respectively. Furthermore there was a general significance of the independent variable on the full model as all p-values were less than 0.05. The limitations stem from the limited sample thus generalization of findings would be inappropriate. The findings of this study however would be invaluable to organizations and management in the tea industry, as they would be useful in tackling bottlenecks in the implementation stage of major and challenging projects. The other sector that would find the study useful are the tea industry partners like TRFK, TBK and even the ministry of agriculture in the government of Kenya. Further research should be conducted in other tea growing regions in Kenya or other countries in the world and even other industries not necessarily the tea industry to confirm if these findings are consistent therein.
## Table of Contents

DECLARATION.................................................................................................................. ii
LIST OF TABLES .................................................................................................................. vi
LIST OF FIGURES ............................................................................................................... vii
ABBREVIATIONS ................................................................................................................ viiii
OPERATIONAL DEFINITION OF TERMS ........................................................................... ix
DEDICATION ....................................................................................................................... xi

ACKNOWLEDGEMENTS

CHAPTER ONE: INTRODUCTION ..................................................................................... 1
1.1 Background of Study ........................................................................................................ 1
1.2 Statement of the Problem ................................................................................................. 4
1.3 Objectives of the study ..................................................................................................... 6
1.4 Significance of the study ................................................................................................ 7
1.5 Limitation ....................................................................................................................... 7
1.6 Scope .............................................................................................................................. 7

CHAPTER TWO: LITERATURE REVIEW .......................................................................... 8
2.1 Introduction .................................................................................................................... 8
2.2 Definition of Business Information Systems in the Organization ............................... 8
2.3. Review of Theories ..................................................................................................... 9
2.3.1 Diffusion of Innovation (Innovation Diffusion Theory) ............................................. 9
2.3.2 Technology Acceptance Model ............................................................................ 13
2.3.3 Technology, Organization, and environment framework .................................. 15
2.4 Criticisms of Theories ................................................................................................. 16
2.4.1 Criticism of Diffusion Innovation Theory ............................................................. 16
2.4.2 Criticism of Technology Acceptance Model ....................................................... 17
2.4.3 Criticism of Technology, Organization, and environment framework ............ 18
2.5 Empirical Review of Theories ..................................................................................... 19
2.6 Knowledge Gap ........................................................................................................... 23
2.7 Conceptual framework ................................................................................................. 23

CHAPTER THREE: RESEARCH METHODOLOGY ......................................................... 26
3.1 Introduction ................................................................................................................ 26
3.2 Research Design ......................................................................................................... 26
3.3 Target population ....................................................................................................... 26
3.4 Description of the Sample and Sampling Procedures ................................................. 26
3.5 Description of Research Instruments .................................................................... 28
3.6 Description of the Data Collection Procedure ........................................................... 28
3.7 Description of Data Analysis Procedures ................................................................ 29

CHAPTER FOUR: PRESENTATION, DISCUSSION AND INTERPRETATION OF FINDINGS ................................................................................................................... 32
4.1 Presentation of Findings ............................................................................................ 32
4.2 Discussion of the Findings ......................................................................................... 53
4.2.1. Demographics and study variables ................................................................... 53
4.2.2. Management technical orientation ................................................................ 54
4.2.3. Resource availability ....................................................................................... 56
4.2.4. Organization ..................................................................................................... 57
4.2.5. Environment .................................................................................................... 58

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .................. 60
5.1 Summary .................................................................................................................... 60
5.2 Conclusions ................................................................................................................ 60
5.3 Recommendations ...................................................................................................... 61
5.4 Further research ......................................................................................................... 62

APPENDIX I: CONSENT ................................................................................................... 69
APPENDIX II: QUESTIONNAIRE ..................................................................................... 70
APPENDIX III: INTERVIEW SCHEDULE FOR MANAGEMENT RESPONSIBLE TO BUSINESS INFORMATION SYSTEMS INNOVATIONS ........................................................................... 75
LIST OF TABLES

Table 1.1 Tea Production. ...................................................................................... 1
Table 1.2 Tea Export and Percent share............................................................... 2
Table 2.1 Core constructs for Technology Acceptance Model................................. 17
Table 3.1 Sample Size .......................................................................................... 27
Table 3.2 Independent variables in the set Logit model......................................... 30
Table 4.1 Gender representation in relation to job position.................................33
Table 4.2 Years of service representation in relation to job position....................33
Table 4.3 Age representation in relation to job position.......................................33
Table 4.4 Academic representation in relation to job position.............................34
Table 4.5 Department representation in relation to job position.........................34
Table 4.6 Adoption status as revealed by the dependent variable.........................34
Table 4.7 Factors motivating adoption/decline of BIS in order of importance......43
Table 4.8 Test of level of adoption of BIS re-statutory payments..........................46
LIST OF FIGURES

Figure 2.1 Functions of a business information system from a business context……14
Figure 2.2 Diagram/schematic theory of Diffusion process...............................16
Figure 2.3 Diffusion schema..............................................................................17
Figure 2.4 Conceptual Framework of the research problem..............................12
Figure 4.1 Job position versus adoption of BIS.................................................38
Figure 4.2 Age versus adoption of BIS..............................................................39
Figure 4.3 Education versus adoption of BIS...................................................40
Figure 4.4 Department versus adoption of BIS.................................................41
Figure 4.5 Resource availability versus adoption of BIS(availability context).....43
Figure 4.6 Resource availability versus adoption of BIS (scarcity context).......44
Figure 4.7 Organization factors versus adoption of BIS (1st rank)......................46
Figure 4.8 Organization factors versus adoption of BIS (2nd rank).....................47
Figure 4.9 Organization factors versus adoption of BIS (3rd rank)......................47
Figure 4.10 Environmental factors versus adoption of BIS (1st rank).................50
Figure 4.11 Environmental factors versus adoption of BIS (2nd rank)..............51
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>BIS</td>
<td>Business Information System</td>
</tr>
<tr>
<td>CRM</td>
<td>customer relationship management</td>
</tr>
<tr>
<td>DOI</td>
<td>Diffusion of innovation</td>
</tr>
<tr>
<td>EATTA</td>
<td>East African Tea Trade Association</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic Data Exchange</td>
</tr>
<tr>
<td>GDP</td>
<td>Growth Domestic product</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
</tr>
<tr>
<td>IDT</td>
<td>Innovation Diffusion Theory</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>KTDA</td>
<td>Kenya Tea Development Agency</td>
</tr>
<tr>
<td>LIS</td>
<td>logistic information system</td>
</tr>
<tr>
<td>MNC</td>
<td>Multinational companies</td>
</tr>
<tr>
<td>OLR</td>
<td>Ordered logistic regression</td>
</tr>
<tr>
<td>PEOU</td>
<td>Perceived ease-of-use</td>
</tr>
<tr>
<td>PU</td>
<td>Perceived usefulness</td>
</tr>
<tr>
<td>SME</td>
<td>Small &amp; medium sized enterprises</td>
</tr>
<tr>
<td>TAM</td>
<td>Technology Acceptance Model</td>
</tr>
<tr>
<td>TBK</td>
<td>Tea Board of Kenya</td>
</tr>
<tr>
<td>TOE</td>
<td>Technology Organization Environment model</td>
</tr>
<tr>
<td>TRFK</td>
<td>Tea Research Foundation of Kenya</td>
</tr>
<tr>
<td>UNFAO</td>
<td>United Nations Food &amp; Agricultural Organization</td>
</tr>
</tbody>
</table>
OPERATIONAL DEFINITION OF TERMS

Adoption - is the process of which transfer (conversion) between an old system to a target system occurs in an organization.

BIS (Business Information System)-can be defined as a system integrating information technology, people and business.

Black Tea - the processed product of harvested tea from the firm that goes through a process of oxidation and high heat drying to produce a beautiful black granule.

Business - An activity of making, buying, selling or supplying goods or services for money, trade or commerce.

Business Process - the unique ways in which firms co-ordinate and organize work activities, information and knowledge to produce a product or a service.

Close-ended question - a style of survey question that has a finite set of answers predetermined by the researcher from which the respondent chooses.

Customer relationship management - is defined as the approach for managing customer related knowledge to increase strategic significance.

Data - Raw material required for processing e.g. facts, events, and transactions etc.

Diffusion - is the communication of an innovation through the population

Digital Firm - organization where nearly all significant business processes and relationships with customers, suppliers and employees are digitally enabled, and key corporate assets are managed through digital means.

Firm - organization established for commercial purpose. The terms organization, firm, company and enterprise are used interchangeably.

Innovation - is an idea, practice, or project that is perceived as new by an individual or other unit of adoption.
IT/IS/ICT  A broad subject concerned with technology and other aspects of managing and processing information dealing with the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information to achieve efficiency.

KTGA (Kenya Tea Growers Association)-the umbrella organization for large scale and private-owned tea estates

Logistic information system-is a computer based information system that supports every aspect of the logistics management process, which involves the co-ordination of activities, such as scheduling, inventory replenishment and material flow planning.

Rate of diffusion- is the speed of which the new idea spreads from one extent in the firm to the other.

Respondent - a person who is providing responses to the researcher’s survey.

Sample- a subgroup of selected respondents derived from target population.

Universe- a sample of respondents.
DEDICATION
This work is dedicated to my dear wife Sarah and darling daughter Monica for their understanding when I could not have had enough time for them, during my entire course. Special dedication to Mama and Baba (deceased).

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I most sincerely thank the Institute of Open Learning, Kenyatta University for making it possible for this program reaching me at my doorstep. I thank my supervisors Mr. Thomas Nyambane and P.B.O. Ochola.
Special thanks to Dr. D.M.Nzuki for the invaluable supervision he has given me all through to this stage.
I feel indebted to Eastern Produce Kenya Limited for giving me one of the greatest opportunities in my lifetime, to be a better and all-rounded manager than I would never have been elsewhere.
Above all I thank the Almighty God for giving me life, wisdom and precious time to accomplish this goal.
Thank you.
CHAPTER ONE: INTRODUCTION

1.1 Background of Study

Tea is the most popular manufactured drink in the world, in terms of consumption three billion cups is believed to be drunk daily. Its consumption equals all other manufactured drinks in the world—including coffee, chocolate, soft drinks, and alcohol put together (Marcfarlane, 2004).

India is the world’s largest tea drinking nation (Sanyal, 2008) although the per capita consumed of tea remains a modest 750 gm./person every year as compared to Turkey who have a per capita of consumption of 2.5 kgs/person per year and is the world’s greatest capita. See world leading producers of tea in metric tonnes Table 1.1

Table 1.1 Tea Production (in metric tons)

<table>
<thead>
<tr>
<th>County</th>
<th>2010</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1,467,467</td>
<td>1,375,780</td>
<td>1,274,984</td>
</tr>
<tr>
<td>India</td>
<td>991,180</td>
<td>972,700</td>
<td>987,000</td>
</tr>
<tr>
<td>Kenya</td>
<td>399,000</td>
<td>314,100</td>
<td>345,800</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>282,300</td>
<td>290,000</td>
<td>318,700</td>
</tr>
<tr>
<td>Turkey</td>
<td>235,000</td>
<td>198,601</td>
<td>198,046</td>
</tr>
</tbody>
</table>

Source: (UNFAO, 2010)

According to FAO, in 2007 the largest importer of tea, by weight was the Russian Federation, followed by the UK, Pakistan, and the USA. Kenya, China, India, and Sri Lanka are the largest exporters of tea in the World. Table 1.2
<table>
<thead>
<tr>
<th>Country</th>
<th>2010 Amount</th>
<th>2010 %</th>
<th>2009 Amount</th>
<th>2009 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>302,419</td>
<td>17.5</td>
<td>302,949</td>
<td>19.1</td>
</tr>
<tr>
<td>India</td>
<td>189,000</td>
<td>10.9</td>
<td>193,000</td>
<td>12.3</td>
</tr>
<tr>
<td>Kenya</td>
<td>441,021</td>
<td>25.5</td>
<td>342,482</td>
<td>21.8</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>298,587</td>
<td>17.3</td>
<td>279,839</td>
<td>17.8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>87,101</td>
<td>5</td>
<td>92,304</td>
<td>5.9</td>
</tr>
<tr>
<td>Others-Africa</td>
<td>173,927</td>
<td>10.1</td>
<td>162,886</td>
<td>10.3</td>
</tr>
<tr>
<td>Others-Africa</td>
<td>236,921</td>
<td>13.7</td>
<td>200,968</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Source: (TRFK, 2010)

Kenya lies astride the equator on the East Coast of Africa and has diverse and fascinating features. The capital city is Nairobi, the business hub of East and Central Africa. Agricultural economy accounts for 24% of the GDP, employing two thirds of the population of 40 million Kenyans and accounts for 70% of the export earnings. During the last four decades Kenya has increased the production of tea 25 fold (Ochanda, 2012).

Tea production of Kenya is sourced from small scale growers under the umbrella of KTDA and accounts for 60% of the total tea production while the multinationals (MNC) sector and large scale farmers account for the rest of the 40% (TBK, 2009)

Tea industry cannot be overlooked considering the importance it has on the national and global economy.

There are several challenges in the industry, namely (1) rising labor costs, (2) price volatility on world markets, (3) revaluation of the Kenya Shilling vis-à-vis the USA dollar, and (4) production outpacing exports.

To overcome these challenges there has been need to shrink the size of organization by introducing business information systems.

(Laudon, 2004) believes that from an economic standpoint, information system technology can be viewed as a factor of production that can be freely substituted for
capital and labor. As the cost of information system technology falls, it is substituted for labor, which historically has been a rising cost. Hence IS technology should result in a decline in the number of middle managers and clerical staff as IT substitutes for the labor.

IT also helps firms contract in size because it can reduce transaction costs, the costs incurred when a firm buys in the marketplace what it cannot make for itself. Accordingly to transaction cost theory, firms and individuals seek to economize on transaction cost, much as they do on production costs. (Laudon, 2004).

(Laudon, 2007) confirms that business environments are constantly changing, new technology, politics, customer preferences, and regulations happen all the time. Generally when businesses fail, it is more often than not, because they failed to respond adequately to changes in their environment.

The study will be done in Nandi Hills, Nandi County. Nandi Hills falls in one of the seven geographical regions (others Cherangany, Nyambene, Mt.Kenya, Aberdare, Kericho and Kisii) that have favorable weather conditions for growing tea.

Majority of the tea grown is under the auspices of the large scale growers with two out of the first four large MNC in Nandi. These are Eastern Produce Kenya Limited and Williamson Tea (Kapchorua), the other two large companies are Uniliver and James Finlay whose business transverse mainly the Kericho region.

The need to introduce new business information systems in these selected tea firms, has been driven by the same factors that other major players like KTDA have. KTDA managed factories have made lots of effort in encompassing BIS in their operations.

In the current day and age information technology (IT) and business information system (BIS) are universally regarded as essential tools in enhancing competitiveness of the economy of a country. (Laudon, 2004) summarizes that “Information technology
can reduce internal management costs. Accordingly to agency theory, the firm is viewed as a ‘nexus of contracts’ among self-interested individuals rather than as a unified, profit-maximizing entity. A principal (owner) employs ‘agents’ (employees) to perform work on his or her behalf. However agents need constant supervision and management because otherwise they will lead to pursue their own interests rather than those of the owners. As firms grow in size and scope, agency costs or coordinate costs rise, because owners must expend more and more effort supervising and managing employees. IT, by reducing the costs of acquiring and analyzing information, permits organizations to reduce agency costs because it becomes easier for managers to oversee a greater number of employees.

Tea is mostly grown in developing countries and labor costs account for 50-60%. To maximize on the margins, there is need to ensure that where cost leakages appear these are sealed-off, and introduction of business information systems can be relied upon to do this task.

1.2 Statement of the Problem

The study focused on the determinants of business information systems adoption in selected tea firms, in Nandi County Kenya and with an aim to gain an in-depth understanding of factors that influence the adoption of BIS by business operations.

Currently the tea industry is yet to wholly embrace new ICT and BIS, but studies have been going on in KTDA by their General Manager-ICT. (Mwende, 2010). In his article some of the drivers listed as those embracing business information systems were several namely, (1) increasing dependence on information systems and communication infrastructure that delivers it,(2) e-business strategies are business driven, thus depend on the entities beyond the direct control of the organization,(3)the
potential for technologies to dramatically hasten business process, reduce costs and bring new opportunities and (4) the risk of dragging behind in a global economy.

The researcher tested the independent variables set out in his research, that is, management technical orientation, and availability of funds, organization type/size, and environment against the dependent variable, adoption of business information systems.

Rogers (1995) reviewed nearly 1500 studies where variants in IDT are used to investigate the adoption of technological innovation in an array of settings including agriculture, healthcare, city planning and economic development. Other set of studies focus on, how these attributes that most greatly influenced behavioral intention and use. Rogers developed his IDT controls by identifying the product attributes that most greatly influence adoption.

Similarly these attributes were confirmed to be 1) relative advantage; 2) compatibility and 3) complexity are consistently related to innovation adoption (Chen et el, 2000).

Since IDT studies had not been clearly or categorically done in the tea industry as a unit of agricultural sector, in Kenya it confirmed why the researcher was convinced that these areas were worthy to be researched on.
1.3 Objectives of the study

The main objective was to establish the determinants of business information system adoption in business operations.

The specific objectives being:

i. To establish effect of management technical orientation on business information systems adoption in selected Tea Companies in Nandi County

ii. To establish the effect of organization type/size on business information systems adoption in selected Tea Companies in Nandi County

iii. To establish effect of availability of resources on adoption of business information systems adoption in selected Tea Companies in Nandi County

1.4 Significance of the study

This study therefore would be useful going forward in the contribution to unravel some of the determinants that affect BIS adoption. The potential value of BIS is well documented and shows that there are obvious benefits in cost reduction, improved product quality, increased reach to new customers and suppliers and even creates new ways of selling existing products. (Saffu et al., 2007) This study therefore would be useful to the modern organization concerned about doing business effectively and efficiently at the lowest cost of production. Such focus can open opportunities for the firms to gain competitive advantage through cost leadership, improved human resource management and customer satisfaction which has direct implication on the organization returns.
1.5 Limitation
The study focused in the tea industry at Nandi Hills, in Nandi County. This study only focused on large and multinational tea firms under the umbrella of KTGA which accounts for only 40% of the tea production in Kenya. KTDA which is the overall umbrella of the majority (60%) of tea producers was not covered. The study was done with consideration in mind of the limitation offered by the intervening variables such as management technical orientation, organization, environmental factors and resource availability all of which there were varied from one firm to the other and such generalization of outcomes would not be appropriate.

1.6 Scope
This study is about determining the extent of business information system adoption in selected tea firms’. The sample for this study covers only the selected tea firms in Nandi County, owned by private multinationals and private companies. All the companies are all working under the umbrella of either KTGA or on their own but all command rules from TBK. The researcher will focus on the nature and type of business information systems in both manual and computerized or a combination of the two.

The researcher will rely on information and explanations from only those senior managers that are directly related to matters information systems, which is the Information Technology Manager, system administrator who can thereafter select knowledgeable staff who can assist in advancing the course of the research.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter defined the key independent variable, reviewed the theoretical literature and its criticisms, and thereafter reviewed the empirical literature and summarized the knowledge gaps in the study. The study was all about determining the factors that affected business information system adoption, from a business context.

2.2 Definition of Business Information Systems in the Organization

The Business information systems (BIS) can be defined as systems integrating information technology, people and business. BIS bring business functions and information models together for establishing effective communication channels which are useful for making timely and accurate decisions and in turn contribute to organizational productivity and competitiveness.

This paradigm shift leads to global outsourcing, strategic alliances and partnerships to be competitive in terms of price, quality, flexibility, dependability and responsiveness. (Gunasegaram, 2012)

Loudon, (2007), defines information systems as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making, coordination, and control in an organization. Figure 2.1.

Information systems(IS) can be any organized combination of people, hardware, software, communications networks and data resources that stores and retrieves, transforms, and disseminates information in an organization.(O’Brien, 2007).

While the terms IS and information technology are sometimes used interchangeably, they are two distinct concepts i.e. IS describes all of the components and resources necessary to deliver its information and functions to the organization, in contrast to
the term IT which refers to the various hardware components necessary for the systems to operate.

Figure 2.1. Functions of a Business information System from a business context.


2.3. Review of Theories

2.3.1 Diffusion of Innovation (Innovation Diffusion Theory)

Innovation Diffusion Theory (IDT) is a model that explains the process by which innovations in technology are adopted by users. Rogers defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption.” (Rogers, 1995). Diffusion is defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system.” He further explains that individual innovativeness falls into
five categories from earliest to latest adopters i.e. (innovators, early adopters, early majority, late majority, laggards). Figure 2.2.

Innovation Diffusion Theory considers a set of attributes associated with technological innovations that affect their rate of widespread adoption. Rogers defines these attributes as;

Relative advantage-“The degree to which an innovation is perceived to be better than the idea it supersedes.”

Compatibility-“The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters.”

Complexity-“The degree to which an innovation is perceived as relatively difficult to understand and use.”

Trialability-“The degree to which an innovation may be experimented with on a limited basis.”

Observability-“The degree to which the results of an innovation are visible to others.”

Among these attributes, only relative advantage, compatibility and complexity are consistently related to innovation (Chen et al., 2000).

A meta-analysis by Tornatzky & Klein (1982) identified other characteristics: costs, communicability, divisibility, profitability and social approval. Among them, relative advantage, compatibility and costs were found to be the most frequently identified factors for innovation diffusion among organizations (Tornatzky & Klein, 1982)

Findings in our study saw this theory play a major role in determining the level of adoption of BIS in the variable, management technical orientation. Supervisors who made a considerable proportion of those who have been in
employ for over 10 years showed a low level of BIS adoption due to the fact that their level of appreciating the relative advantages of new systems was inadequate, and also level of education on the lower end thus finding some of the new innovations in BIS as complex and thus uneasy to take up.

Our findings with the variable environment also indicated that those who were not sure or those who had not enjoyed the benefits of using (trailability) of an innovation were negatively responsive in BIS adoption.
Figure 2.2. Diagram/schematic theory for Diffusion Process

Source: Rogers (1995)

Research has, however, consistently found that technical compatibility, technical complexity, and relative advantage (perceived need) are important antecedent to the adoption of innovations (Bradford & Florin, 2003; Crum et. al., 1996). Figure 2.3.
Figure 2.3. Diffusion schema

2.3.2 Technology Acceptance Model

Technology adoption has gained prominence with introduction of TAM (Davis, 1989; Davis et al., 1989), which argues that the intention to adopt or use new Information System is determined by perceived usefulness and perceived ease of use. The final conceptualization of TAM excluded the attitude construct in order to better explain intention parsimoniously (Venkatesh et al., 2003). Table 2.1

The objective of TAM is:

“to provide an explanation of the determinants of computer acceptance that is general capable of explaining user behavior across the board range of end user computing technologies and user population, while at the same time being both parsimonious and theoretically justified” (Davis, 1989, 985).
### Table 2.1 Core constructs for Technology acceptance model

<table>
<thead>
<tr>
<th>Core Construct</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived usefulness</td>
<td>&quot;the degree to which a person believes that using a particular system would enhance his or her job performance&quot; (Davis, 1989, 320)</td>
</tr>
<tr>
<td>Perceived ease-of use</td>
<td>&quot;the degree to which a person believes that using a particular system would be free of effort&quot; (Davis, 1989, 320)</td>
</tr>
</tbody>
</table>

Source: (Davis, 1989)

It has been widely applied to a diverse set of technologies and users (Venkatesh et al., 2003). In the same business context, (Igbaria et al., 1997) uses TAM as a theoretical basis for examining the key factors affecting personal computing acceptance in small firms. Their finding indicate that perceived ease of use is the dominant factor in explaining perceived usefulness and system usage, and perceived usefulness has a strong effect on system usage. Inspired by TAM, (Grandon & Pearson, 2004) identifies perceived usefulness and perceived ease of use as one of the factors that influence electronic commerce adoption behavior. However, perceived usefulness and ease –of –use are not the only factors influencing IS innovations adoption.Referring to TAM, Bagozzi (2007) argues that it is unreasonable to expect that one model and one so simple, would explain decisions and behavior fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers. Findings in our study revealed that where respondents perceived the usefulness of an innovation and its perceived ease of use, the response rate was...
positive and this turned negative whenever they had a reverse perception of another innovation.

### 2.3.3 Technology, Organization, and environment framework

The TOE framework was developed in 1990 (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, and environmental context.

(a) Technological context describes both the internal and external technologies relevant to the firm. This includes current practices and equipment internal to the firm (Starbuck 1976), as well as a set of available technologies external to the firm (Thompson 1967, Khanwalla 1970, Hage 1980).

(b) Organizational context refers to descriptive measures about the organizations such as scope, size, and managerial structure.

(c) Environment context is the arena in which a firm conducts its business – its industry, competitors, and dealings with government (Tornatzky and Fleischer 1990).

The TOE framework as originally presented, and later adapted in IT adoption studies, provides a useful analytical framework that can be used for studying the adoption and assimilation of different types of IT innovation. The TOE framework has a solid theoretical basis, consistent empirical support, and the potential of application to IS innovation domains, though specific factors identified within the three contexts may vary across different studies.

The framework is consistent with the DOI theory, in which Rogers (1995) emphasized individual characteristics, and both the internal and external characteristics of the organization, as drivers for organization innovativeness. These
are identical to the technology and organization context of the TOE framework, but the TOE framework also includes a new and important component, environment context. The environment context presents both constraints and opportunities for technological innovation. The TOE framework makes Rogers’ innovation diffusion theory better able to explain intra-firm innovation (Hsu et al., 2006). Findings in this study revealed that the two variables environment and organization were exhaustively explained, where we noted that company size and structure had a significant role in BIS adoption as well as competition from neighboring firms.

2.4 Criticisms of Theories

2.4.1 Criticism of Diffusion Innovation Theory

One of the problems with adopting a normal distribution curve surfaced as early consumer theorists examined the model and attempted application. Because Rogers offered no empirical justification for using a normal distribution for all products, attempts to improve the predictability of the model and offer more does provide a more dynamic model by examining innovative models were conducted by, among others, Bass (Mahajan, Muller & Srivastava, 1990). Bass divided the market into Innovators and Imitators, which led to some confusion, because according to Bass, Innovators as Rogers defined them, were not the same as the first adopters (Mahajan, Muller & Bass, 1990). However, working with the adoption formula, Bass does provide a more dynamic model by examining the coefficient of external and internal influence, respectively, as well as the market potential, noting examples where the categories first proposed by Rogers may vary, according to those three variables (Mahajan, Muller & Bass, 1990). The advantage to adapting Bass’ model to Rogers’ categories is that the categories reflect the adopter groupings that are unique.
to a specific innovation. However, the disadvantages are that it depends largely on the values assigned to external and internal influence; stable estimates of these values can only be obtained if the data include the peak of the distribution curve (Mahajan, Muller & Srivastava, 1990). Continued research has been encouraged to focus less on direct effects in diffusion theory, and to examine other variables in model, such as price, individual innovator characteristics, marketing, and competitor initiatives (Gatignon & Robertson, 1985).

Lambkin and Day (1989) take exception to diffusion theory model as being aligned too much with demand side economics. They argue that diffusion theory ignores the structure and interplay of competition, marketing mix variables, competitive advantage, resource allocation, and how they might influence the speed and pattern of diffusion in alignment with the product life cycle (Lambkin & Day, 1989). However, they also note that the basic models have been extended in an attempt to include supply-side variables (Lambkin & Day, 1989, pg.7).

2.4.2 Criticism of Technology Acceptance Model

Over the last two decades, numerous studies about technology acceptance have been conducted in different fields. The technologies and applications being tested include internet banking (Chang, 1998), electronic commerce applications (McCloskey, 2003), and electronic meeting systems (Nunamaker et al., 1992). In most of these studies existing models, like TAM, and others, were able to explain and predict the adoption process sufficiently well.

Systems tested in the past, usually consisted of a personal computer with a standard software application and a single user working with this system in a private work situation. In contrast, future information technologies will be designed to continuously support users in technology-enhanced environments by providing a
variety of personal and context-adapted services throughout the day. Hence, future technologies will not only break the constraints of time and place, but they will also vary significantly regarding their degree of autonomy. Several authors, like, e., g., (Tennenhouse, 2000) anticipate future environments, in which networked computers proactively anticipate our needs and, sometimes, even take actions on our behalf. Consequently, factors like ease-of-use, which were used to predict technology adoption for the last 20 years, might not be appropriate anymore. At the same time, new factors, which are not integrated in any of the existing models, might not be appropriate anymore. At the same time, new factors, which are not integrated in any of the existing models, might play crucial roles in the adoption decision. For example, a recent study showed that the social situation, in which a context-aware technology is used, significantly influences the acceptance of the system (Rocker, 2009). Similar studies underpin those findings and shows that the acceptance of future information technologies is not determined by usefulness and ease-of-use alone, but is also affected by a variety of other factors. Hence, it is important to identify the factors, which are actually influencing the acceptance of context-aware systems and use this knowledge to adapt existing acceptance model to the characteristics of future information systems.

2.4.3 Criticism of Technology, Organization, and environment framework

According to the theory of TOE, the organization adoption and implementation of technological innovations is influenced by three elements as discussed above under (par.2.3.3). These three elements are posited to interact with each other and to influence technology adoption decisions (Depietro et al., 1990). Although the TOE theory has primarily been used to study the adoption of innovations, it does not provide concrete model describing the factors that influence
the organizational adoption decision; it rather provides taxonomy for classifying adoption factors in their respective context. The TOE theory has been used by a large number of studies to investigate the adoption of, for example, the Electronic Data Exchange (EDI) (Kuan and Chau, 2001), open systems (Chau and Tam, 1997), and e-business (Zhu and Kraemer, 2005).

The main contribution of TOE is that it encourages the researcher to take the broader context into account in which innovation takes place.

2.5 Empirical Review of Theories

(Weerasinghe et al., 2012) in their studies in the corporate tea sector in Sri Lanka showed that estates did not become innovators or early adopters of ICT by adopting advanced or intermediate type technologies, but were mostly confined to the basic facilities. The purpose of the study was to determine empirically the current status of adoption of ICT and in turn the digital divide resulting from which the cooperative tea production sector in Sri Lanka and the factors affecting behavior. This study was based on Innovation Diffusion Theory and the results from the ordered logistic regression (OLR) technique highlights that the sales turnover of the tea estates, ICT literacy, attitudes of managers and IT training of staff has a significant impact on the adoption of ICT

(Lee et al., 2011) in their empirical study “Supporting Employees’ Intentions to use E-Learning Systems”, whereby they used both IDT in combination with TAM. They used the five factors: relative advantage, compatibility, complexity, trailability and observability as determinants of perceived usefulness (PU) and perceived ease-of-use (PEOU) and behavioral intention (BI). This study would be useful elsewhere, say in designing and promoting e-learning systems.
The study found that compatibility, complexity, relative advantages, observability and trialability had significant effects on the employees’ behavioral intention of using e-learning systems, and furthermore the findings supported existing research that found a strong relationship between PEOU and PU, as originally proposed by (Davis et al., 1989) (Ghobakhloo et al., 2011) In their empirical study “Reasons for IT adoption and sophistication within manufacturing SMEs”, examine the drivers within the TOE framework that influence the level of IT sophistication within Iranian SMEs. They found out that external pressure, information processing capacity improvements, IT-enabled organizational improvements, and competitive pressure are the main reasons of IT sophistication within SMEs so that more significant presences of these drivers result in higher level of IT sophistication. This research goes beyond economic realistic models to explain innovation diffusion in organizations and incorporate information processing and IT-enabled organizational capabilities perspectives to investigate the reasons for IT sophistication. Also the study reveals that besides IT-enabled benefits (e.g. innovativeness and competitiveness) persuading SMEs to adopt IT due to pressure (i.e. external pressure from customers/suppliers and competitive pressure) (Chuchuen et al., 2011) in “The adoption factors of E-CRM in service sector of Thai SMEs,” combined the use of Diffusion of innovation theory and Technology-Organization-Environment framework to specifically examine and explain the relationships among technology factors, organization factors, external or environment factors all on e-CRM adoption, and the relationships between the organization perceived benefits on e-CRM adoption and organization performance which is the aim of e-CRM adoption in the organization under study.
In their conclusion four important factors that tested positively in the study namely customer familiarity to e-commerce usage, customer knowledge to e-commerce, customer participation to e-commerce and customer accessibility to e-commerce and compare fairly well to the researcher’s study.

Barbosa, H.D and Musetti, M.A., (2010), “Logistics information systems adoption: an empirical investigation in Brazil,” examined whether the level of LIS adoption in manufacturing companies is influenced by organizational profile variables, such as company size, and the nature of its operations and their subsectors. Findings from this empirical study indicate that characteristics such as the size of the companies and the nature of their operations influence the levels of LIS adoption, however comparisons regarding the subsectors appeared to be of little influence.

(Singh et. al., 2010), carried out a study on employees’ adoption of e-procurement, and concentrated in the use of Technology Acceptance Model (TAM), as the best suited model for the study as confirmed in their body of the study. The determinants to test were namely perceived benefits of the system, perceived ease-of use of the system, employee training and computer self-efficacy. All these determinants were taken as the independent variables being tested against the dependent variable, behavioral intention to use e-procurement system.

They used purposive sampling considering the fact that the population was quite large and the required respondents were specific.

All results tested positively confirming that perceived benefits and perceived ease-of use of e-procurement was a main driver in influencing the respondents’ behavioral intention to use e-procurement system.

(Saffu et. al., 2007) in, “An empirical study of perceived strategic value and adoption constructs: the Ghanaian case”, found out that factor analysis demonstrated
convergent and discriminant validity and construct reliability. PSV construct resulted in four factors: Decision Support(DS), Information Management(IM), Organizational Support(OS) and Decision Aids(DA). The findings were found to be both consistent and inconsistent with prior research. The adoption construct yields five factors: perceived usefulness(PU), ease of use(EU), compatibility(C), organizational readiness(OS) and external pressure(EP). Furthermore there is a unique factor in this empirical study to all other quoted, as this was one that was done in an African state and may have quite a lot of similarities in all fronts.

(Chong et al., 2009) in their empirical study noted that organizations which would like to adopt e-commerce or increase the level of adoption will be able to apply strategies and make managerial decisions based on the research findings. In order to implement e-commerce or Collaborative supply chain, the commitment is needed from more than one member of the supply chain. Likewise, efforts in promoting collaborative supply chain in the industry require the implementation of e-commerce from the industry. Organizations that would like to adopt the technology will require changing their mindsets in terms of sharing of information. Furthermore, organizations should also be ready and commit the necessary technical and financial resources to the implementation of e-commerce. As financial and technical feasibility seems to be an important influence on whether organizations adopt e-commerce, a company with better financial or technical resources might consider providing more of such assistance to their trading partners. In the long run, the financial cost of assistance could be covered by having a more efficient supply chain. Organizations with less resource will also realize the benefits of adopting e-commerce in their supply chain which in the long run will enable them to compete with their bigger rivals.
2.6 Knowledge Gap

Several theories have been reviewed by the researcher on both theoretical and empirical studies on innovation. Three innovation diffusion theories have been reviewed generally: Innovation Diffusion Theory (Rogers, 1995), Technology acceptance mode, (Davis, 1989) and Technology Organization Environment framework and, (Tornatzky and Fleisher, 1990) because there is a thin borderline between where these theories interrelate in the organization, on an individual basis, by the environment and even from a technological point of view and furthermore they do complement each other.

The researcher is interested in determining the factors that affect business information systems in selected tea companies in the rural setup of Nandi Hills town in Nandi County Kenya.

Lots of resources, in man hours, money, material has been pumped in projects year in and year out, and yet organizations do not seem to learn as to why not the penetration of innovation do not seem to move at a faster rate. Assumptions are always made that since it for as long as it has been adopted elsewhere say by a competitor in the neighborhood it would be automatic to have it adopted in your organization. This is what the researcher wants his findings to make clear based on the theories that they are some specific trend and attributes in the tea industry, that affect the rate of adoption of business information systems, and if identified, future innovations or stalled projects could be revived on the basis of those findings from the research.

2.7 Conceptual framework

This study hinges on determining the factors that impact on business information systems adoption. Figure 2.4. The factors that are under study include the independent
variable (management technical orientation, resource availability, organization and environment), while the dependent variable is business information system adoption. (Rogers, 1995) duels on five factors that affect the rate of diffusion or the rate of adoption as (1) relative advantage, (2) compatibility, (3) trialability, (4) observability and (5) complexity. Other than the first four all factors always give a positive result. Since the results of the dependent variable are dichotomous, the TOE framework will also be important to pursue, since three out of the four independent variables relate to technology, organization and environment which makeup the TOE framework (Tornatzky and Fleischer, 1990).
Figure 2.4. Conceptual Framework of the research problem

Source: Researcher (2012)
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter starts with the research purpose, design and the approach. It outlines research design and sampling methods. Finally, it presents the data collection procedures, method used in data analysis.

3.2 Research Design

The study employed an exploratory approach to enable it get a better understanding of factors affecting business information systems adoption. Exploratory research was conducted to clarify and research a better understanding of the nature of the problem. It consequently proved it was appropriate to have been used as there was little prior knowledge of the problem researched. Exploratory study was indeed a valuable means of finding out.

3.3 Target Population

The population of the study covered estate employees only for the selected firms in Nandi Hills, Nandi County. A total number of 67 respondents were drawn from management and specific support staff in various departments using information technology.

3.4 Description of the Sample and Sampling Procedures.

Purposive sampling method was applied for the study at the selected tea firms in Nandi Hills, and did fairly represent the large scale and multinational organizations in Nandi County.

The sample of 67 respondents was selected from persons whom the researcher believed would advance his course of research. Purposive sampling, a non-probability sampling technique also known as judgmental, selective or subjective sampling relies
on the judgment of the researcher when it comes to selecting the units (e.g. people, cases/organizations, events, pieces of data) that are studied. The researcher further applied a mix of homogeneous and expert sampling techniques respectively.

Homogeneous sampling was used as the sample was specific to a group, in this case within one line of occupation and that is information systems and information technology.

The sample of 67 was selected from a population of 238.

“Think of the person or potential for advancing your understanding and look there!” (Palys, 2008).

Table 3.1. Sample Size

<table>
<thead>
<tr>
<th>Company</th>
<th>Estate</th>
<th>Population</th>
<th>Respondents Strata</th>
<th>Distribution</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Produce Kenya</td>
<td>Chemomi</td>
<td>54</td>
<td>Senior management</td>
<td>11, 66%</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle manager</td>
<td>3, 17%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supervisor</td>
<td>3, 17%</td>
<td></td>
</tr>
<tr>
<td>Kapsumbeiwa</td>
<td>60</td>
<td></td>
<td>Senior management</td>
<td>10, 50%</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle manager</td>
<td>7, 33%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supervisor</td>
<td>3, 17%</td>
<td></td>
</tr>
<tr>
<td>Kepchomo</td>
<td>40</td>
<td></td>
<td>Senior management</td>
<td>3, 25%</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle manager</td>
<td>5, 50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supervisor</td>
<td>3, 25%</td>
<td></td>
</tr>
<tr>
<td>Kibwari</td>
<td>Kibwari</td>
<td>34</td>
<td>Senior management</td>
<td>2, 25%</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle manager</td>
<td>2, 25%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supervisor</td>
<td>5, 50%</td>
<td></td>
</tr>
<tr>
<td>Williamson Tea</td>
<td>Kapchorua</td>
<td>50</td>
<td>Senior management</td>
<td>2, 20%</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle manager</td>
<td>5, 40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supervisor</td>
<td>5, 40%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>238</strong></td>
<td></td>
<td><strong>67</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source; Researcher (2012)
3.5 **Description of Research Instruments**

A structural questionnaire and interview schedule was prepared with the intention to capture the determinants affecting business information systems adoption. The structured questionnaire was used for its convenience and was delivered in person. Face-to-face interview was used to ensure that the respondents had a high response rate. Ochola et al., 2002. Believe the results of either face-to-face interviews or questionnaires have a similar accuracy rate.

3.6 **Description of the Data Collection Procedure**

The questionnaires were tailored to question the specific study objectives. At least four sub sections wherefrom each section were tackled against the dependent variable of adoption of information systems.

Also the questions in the questionnaire were under specific headings as highlighted in chapter 2, section 2.7 (conceptual framework), thus ensuring enforcement of validation of study.

The research for purposes of reliability used only primary data to explore each and every independent variable relationship to the dependent variable.

A questionnaire was sent by person to the key person responsible for IS management in the organization under study. Respondents were chosen with the help of the lead respondent, as that ensured that the researcher’s goal of advancing the study was achieved. They were thereafter taken through the questionnaire on how to answer the simple close-ended question. Key to the interview was the confirmation that no interpretation was necessary as all the sample would be selected from only those who knew how to read and write. The researcher ensured that during data collection the targeted population responded to the questions and statements asked based on the
questionnaire and interview schedule only. Any unclear questions were clarified, and
the researcher ensured that before going live to the field, collected data to test for sake
of reliability and realisticness of the instruments, to minimize inaccuracies

3.7 Description of Data Analysis Procedures

Descriptive statistics test was used with appropriate consideration relating to the
nature of the data (Pallant, 2005). To adopt or not to adopt technology is a discrete
choice. Discrete choice models have been widely used in estimating models that
involve discrete economic decision problems (Guere & Moon, 2004). The study used
the logit model otherwise called the logistic regression method because the dependent
variable (adoption of business information systems), was dichotomous and
computatively simple model.
Table 3.2 Independent variables in the set Logit mode

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Expected sign(+ve/-ve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management technical orientation(X₁)</td>
<td>Management traits that may affect the outcome e.g. age, education, experience or gender.</td>
<td>+Positive</td>
</tr>
<tr>
<td>Organization(X₂)</td>
<td>Organization traits that may affect the outcome e.g. size, type, population, production levels</td>
<td>+Positive</td>
</tr>
<tr>
<td>Resource availability(X₃)</td>
<td>Organization traits that may affect the outcome e.g. size, type, population, production levels</td>
<td>+Positive</td>
</tr>
<tr>
<td>Environment(X₄)</td>
<td>Environmental traits that may affect the outcome e.g. government/parastatal, partners, competitors, suppliers</td>
<td>+Positive/-Negative</td>
</tr>
</tbody>
</table>


The model was based on the cumulative logistic probability foundation. Its specifics were in the following form;

If \( P_i = F(Y_i) \)

\[ = F(\alpha + \beta X_i) = \frac{1}{1 + e^{-y}} \]

\[ = 1/1+e^{(\alpha +\beta X_i)} \] ............................... (1)

Where

\( e \) - represents the base of natural logarithm which is approximate 2.718

\( P_i \) – represents the probability that an individual will make a certain choice, in the study whether to adopt a certain business information system or not

In estimating equation (1) above, we multiply both sides by \( (1 + e^{-y}) P_i \) so that dividing \( P_i \) and then subtracting 1 yields

\[ e^{y} = \frac{1}{p} - 1 = P_i/P_i \] ............................... (2)

However since \( e^{y} = 1/e^{y} \), then \( e^{y} = P_i/1-P_i \) so that

By taking the natural logarithms on both sides of the equation we obtain
\[ Y_i = \log \frac{P_i}{1-\Pi} \]

or from equation (1) above we have

\[ \log \frac{P_i}{1-\Pi} = Y_i = \alpha + \beta X_i \] \hspace{1cm} (3)

Where

\[ \frac{P_i}{1-\Pi} = \text{the log of odds that a certain decision will be made.} \]

\[ \alpha = \text{the constant of the equation} \]

\[ \beta = \text{the co-efficient of the predictor variables} \]

Therefore the compressed form of business information system adoption was specified as

Where \( Y = f (MngT, OrgN, RsAvl, EnvN) \)

\[ Y_i = \text{Probability of BIS adoption (1 if adopted, otherwise 0)} \]

\[ MngT = \text{Management Technical Orientation} \]

\[ OrgN = \text{Organization} \]

\[ RsAvl = \text{Resource Availability} \]

\[ EnvN = \text{Environment} \]

Gujarat (1995), the specific model estimated confirmed the log-linear form

\[ Y_i = B_0 + B_1 \ln X_1 + B_2 \ln X_2 + B_3 \ln X_3 + B_4 \ln X_4 + e \] \hspace{1cm} (4)

Where the independent variable are (Table 3.2)

\[ X_1 = \text{Management technical orientation} \]

\[ X_2 = \text{Organization} \]

\[ X_3 = \text{Resource availability} \]

\[ X_4 = \text{Environment} \]

and the dependent variable

\[ Y_i = \text{Business information System adoption} \]
CHAPTER FOUR: PRESENTATION, DISCUSSION AND INTERPRETATION OF FINDINGS

4.1 Presentation of Findings

Demographics information (Table 4.1) indicates the target population comprised of 32.8% (22/67) senior management, 29.8% (20/67) middle level management and 37.3% (25/67) supervisors (Table 4.2). 43.3% of the population was highly experienced with over 16 years of service. All the respondents interviewed had rich educational background with majority (62.7%) being Masters, Bachelors and Diploma holders whereas 37.3% were holders of other academic qualifications like CPA. It is worth noting that senior managers were a highly learned group with a significant majority (19.4%) being holders of Masters and Bachelor’s degrees whereas most supervisors were holders of other academic qualifications (Table 4.4). It was also evident in the survey that the supervisors were the most highly experienced group with 19.4% having over 16 years’ experience. (Table 4.2)

The survey realized a gender participation of 68.7% (46/67) male and 31.3% (21/67) female respondents. 15% of the female respondents were diploma and bachelor’s degree holders while 16.4% of the female respondents had other academic qualifications. There was a remarkable women representation in all cadres of management. Table 4.1 shows women represented about 18% of the middle and senior management while they comprised of 13.3% of the supervision team. There was no statistical association between gender and job position which was an indication of equal opportunity and representation to both genders.
The survey also noted a remarkable age-wise representation across all generations. 62.6% of the respondents were of the age group 30-50 years whereas 17% were above 50 years and 19.4% were between 20-30 years.

Table 4.5 reveals 58.21% of the respondents interviewed were from accounts and administration department, 30% were field and factory production whereas 12% were from engineering and IT departments.

**Table 4.1 Gender representation in relation to job position**

<table>
<thead>
<tr>
<th>Job position</th>
<th>Respondents gender%</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Manager</td>
<td>23.88</td>
<td>8.96</td>
<td>32.84</td>
<td></td>
</tr>
<tr>
<td>Middle Manager</td>
<td>20.90</td>
<td>8.96</td>
<td>29.85</td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td>23.88</td>
<td>13.43</td>
<td>37.31</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>68.66</strong></td>
<td><strong>31.34</strong></td>
<td><strong>100.00</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Source: (Researcher, 2012)*

**Table 4.2 Years of service representations in relation to job position**

<table>
<thead>
<tr>
<th>Years of service</th>
<th>1 Year or Less</th>
<th>2-5 Years</th>
<th>6-10 Years</th>
<th>11-15 Years</th>
<th>16 Years and over</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Manager</td>
<td>9.0</td>
<td>9.0</td>
<td>0.0</td>
<td>0.0</td>
<td>14.9</td>
<td>33</td>
</tr>
<tr>
<td>Middle Manager</td>
<td>4.5</td>
<td>1.5</td>
<td>7.5</td>
<td>7.5</td>
<td>9.0</td>
<td>30</td>
</tr>
<tr>
<td>Supervisor</td>
<td>1.5</td>
<td>7.5</td>
<td>6.0</td>
<td>3.0</td>
<td>19.4</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14.9</strong></td>
<td><strong>17.9</strong></td>
<td><strong>13.4</strong></td>
<td><strong>10.4</strong></td>
<td><strong>43.3</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: (Researcher, 2012)*
Table 4.3 Age representation in relation to job position

<table>
<thead>
<tr>
<th>Age</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50+above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Manager</td>
<td>10.4</td>
<td>7.5</td>
<td>8.8</td>
<td>6.0</td>
<td>32.7</td>
</tr>
<tr>
<td>Middle Manager</td>
<td>3.0</td>
<td>15.0</td>
<td>10.4</td>
<td>1.6</td>
<td>30</td>
</tr>
<tr>
<td>Supervisor</td>
<td>6.0</td>
<td>8.8</td>
<td>12.1</td>
<td>10.4</td>
<td>37.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19.4</strong></td>
<td><strong>31.3</strong></td>
<td><strong>31.3</strong></td>
<td><strong>18.0</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: (Researcher, 2012)

Table 4.4 Academic representation in relation to job position

<table>
<thead>
<tr>
<th>Education</th>
<th>Senior Manager</th>
<th>Middle Manager</th>
<th>Supervisor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters/PhD</td>
<td>3.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Bachelors</td>
<td>16.4</td>
<td>13.4</td>
<td>0.0</td>
<td>29.8</td>
</tr>
<tr>
<td>Diploma</td>
<td>13.4</td>
<td>9.0</td>
<td>7.5</td>
<td>29.9</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>7.5</td>
<td>29.9</td>
<td>37.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32.8</strong></td>
<td><strong>29.9</strong></td>
<td><strong>37.3</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: (Researcher, 2012)

Table 4.5 Departmental representations in relation to job representation

<table>
<thead>
<tr>
<th>Department</th>
<th>Senior Manager</th>
<th>Middle Manager</th>
<th>Supervisor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts or Admin</td>
<td>14.93</td>
<td>13.43</td>
<td>29.85</td>
<td>58.21</td>
</tr>
<tr>
<td>Field production</td>
<td>5.97</td>
<td>5.97</td>
<td>2.99</td>
<td>14.93</td>
</tr>
<tr>
<td>Factory production</td>
<td>8.96</td>
<td>2.99</td>
<td>2.99</td>
<td>14.93</td>
</tr>
<tr>
<td>IT</td>
<td>0.00</td>
<td>5.97</td>
<td>0.00</td>
<td>5.97</td>
</tr>
<tr>
<td>Engineering</td>
<td>2.99</td>
<td>1.49</td>
<td>1.49</td>
<td>5.97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32.84</strong></td>
<td><strong>29.85</strong></td>
<td><strong>37.31</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: (Researcher, 2012)

Table 4.6 Adoption status as revealed by the dependent variable

<table>
<thead>
<tr>
<th>Adoption Status</th>
<th>%No</th>
<th>%Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>19.4</td>
<td>49.3</td>
<td>68.7</td>
</tr>
<tr>
<td>Female</td>
<td>11.9</td>
<td>19.4</td>
<td>31.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31.3</strong></td>
<td><strong>68.7</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: Researcher, 2012
Management and technical orientation

A logistic regression analysis was conducted to predict BIS adoption for 67 respondents using gender, job position, years of service, age, education level and department as predictors.

A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between adopters and decliners (\(\chi^2 = 30.852, p < .021, df = 17\)).

Nagelkerke’s \(R^2\) of 0.519 indicated a moderate relationship between prediction and grouping. Prediction success overall was 80.6% (93.5% adoption and 52.4% for decline).

Out of the six predictors, none was a significant predictor of BIS adoption as demonstrated by the Wald chi square.

Gender

Appendix 1 reveals a positive association between gender and BIS adoption keeping other factors constant (\(\beta = 0.96\)) implying a likelihood of 2.613 in favor of male respondents relative to their female counterparts. Gender was however not a significant predictor of BIS adoption relative to the other five factors in the model (\(\chi^2 = 0.669, p = 0.413, df = 1\)).

Job Position

Of the three categories of job position namely senior management, middle level management and supervisors identified in the survey, the odds of BIS adoption for middle level management was 0.448 relative to that of senior management whereas
that of supervisors was 0.006. This indicated a lower propensity for middle level management and supervisors to favor adopt BIS relative to senior management.

Job position took negative coefficients for middle level management and supervisors ($\beta=-0.802; \beta=-5.059$ respectively) implying a negative association between the two categories and adoption. The test for overall significance for job category as a predictor was not statistically significant ($\chi^2 = 3.858; p=0.145 \, df=2$). See Appendix 1.

**Figure 4.1. Job position versus adoption of BIS**

![Bar chart showing job position versus adoption of BIS]

Source: Researcher, 2012

**Job experience**

Job experience was a highly insignificant predictor of BIS adoption with an overall Probability value of 0.446. The results noted coefficients of 2.066 and 2.938 for the less experienced staff and negative coefficients (-3.326 and -23.099) for highly experienced staff relative to the staff who had served for one year or less. This
implied that staff who had served for 2-5 years and 6-10 years were more likely to favor adoption of BIS relative to those who had served a year or less while highly experienced staff were negatively associated with adoption possibly because most supervisors were found in the highly experienced category yet they were inclined to decline adoption compared to senior management of the same experience.

Age

The age category (Figure 4.2) of 40-50 Years was found to be highly associated with adoption as indicated by 25.37% of the respondents while the age group 30-39 followed closely with 20.90% of the respondents associated with adoption. There was a higher likelihood (0.998) for staff above 40-50 year old and those above 50 year old to favor adoption of BIS relative to 20-30 year old. Coefficients values were 26.315 and 27.278 respectively implying a strong positive association between the two age categories and adoption. The overall test for significance with regard to age was statistically insignificant in the prediction of BIS adoption (P=0.372) see Appendix IV. Weeransinge et al., (2012) found that ICT adoption was more likely to be adopted by those who were senior middle and senior age mainly because of the fact that they are more aware of the organization requirements, and thus specific of their requirements.
Figure 4.2. Age versus adoption of BIS

Source: Researcher, 2012
Education

Similar to the other predictors earlier discussed, the results found education to be insignificant in the prediction of BIS adoption (P=0.640). There were 4 categories of education level in the survey. The reference group consisted of masters and PhD holders. It was observed that respondents with Bachelor’s degrees, Diplomas and other qualifications would more readily favor adoption of BIS relative to Masters and PhD holders. This observation was a result of the small number of Masters and PhD holders who took part in the survey. The odds ratios were 0.9 in favor of Bachelors, 0.44 in favor of Diploma and 0.453 in favor of other academic qualifications. The three categories had positive coefficients (0.412, 2.717 and 3.560 respectively) indicating a positive association between education level and adoption. Appendix IV Saffu et al., 2007 in their study reveals that those who had undergraduate level of education or higher were more likely to be early adopters than those who were of lesser level of education.
All respondents interviewed were from five departments namely Accounts, Field production, factory production, IT and Engineering. Accounts department was used as the reference category in the analysis. The overall significance test for department as a predictor was not statistically significant ($\chi^2=2.032$, $p=0.732$ df=4). see Appendix IV

All departments except factory production had positive coefficients implying higher propensity to adopt relative to accounts department. The department with the highest likelihood for BIS adoption was engineering with an odds ratio of 57 implying 57 times more likely to adopt BIS relative to accounts. The IT department followed closely being 26 times more likely when compared to accounts. Factory production
depicted a coefficient of -0.905 indicating a higher propensity for the production group to decline adoption. The variable was however not statistically reliable in the prediction of BIS adoption (P=0.421). Barbosa et al., (2010) reveals that the nature of operations can influence the level of LIS adoption, as this can be likened to the nature of operations in our study being the department since departments naturally operate differently.

Figure 4.4. Department versus adoption of BIS

Source: Researcher, 2012

Resource availability

A logistic model with two predictors namely resource availability and difficulty in sourcing of resources was used to predict the likelihood of BIS adoption. The model fit was significant ($\chi^2=2376.67$, $p=0.00$, $df=6$) with a strong relationship between prediction and grouping (Nagelkerke $R^2=0.812$). See Appendix IV.

There was a strong and statistically significant association between resource availability and BIS adoption ($\chi^2=1698E9$, $P=0.00$, $df=4$). 60% of the respondents attributed BIS adoption to availability of financial and other support resources. 3.6%
attributed the adoption to technological and financial resources compared to 6.4% who attributed it to financial resources alone. It was established that firms rich in technological resources were highly associated with adoption relative to firms with financial and other support resources ($\beta = 20.605$). Firms with financial resources alone were negatively associated with adoption ($\beta = -20.012$) similar to firms with other support resources alone ($\beta = -2.079$) whereas firms rich in technology and financial resources were negatively associated with adoption relative to those rich in financial and other support resources. Table 4.5 reveals that a higher propensity for firms lacking in financial and technology resources, decline adoption of modern business information systems as indicated by 28% of the respondents. All categories relating to resource availability were significant predictors of adoption with probability values of less than 0.05. This concurs with studies done by Saffu et al. (2007).
With regard to the difficulty and/or ease with which resources were available at the firm level, Figure 4.6 reveals that 75% of the respondents from adopter and decliner firms found it difficult to get resources at the firm level while only 25% found it easier. There was a strong statistical association between the ease/difficulty of resource availability and BIS adoption in the model. Difficulty in resource availability was an impediment to adoption as indicated by negative coefficient ($\beta = -40.255$).
Figure 4.6 Resource availability of BIS adoption (in Resource poverty context)

Does the firm experience difficulties getting resources?

Source: (Researcher, 2012)
Organization

Table 4.7. Factors motivating adoption/decline of BIS in order of importance.

<table>
<thead>
<tr>
<th>Adoption Status</th>
<th>Factors that motivated the firm to adopt / Decline BIS in order of importance</th>
<th>% Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>The usefulness of the innovation</td>
<td>23.9%</td>
</tr>
<tr>
<td>YES</td>
<td>Top management support through funding</td>
<td>23.9%</td>
</tr>
<tr>
<td>YES</td>
<td>Anticipated ease of use</td>
<td>14.9%</td>
</tr>
<tr>
<td>YES</td>
<td>Company size of the firm and structure</td>
<td>20.8%</td>
</tr>
<tr>
<td>NO</td>
<td>Lack of technical support</td>
<td>22.4%</td>
</tr>
<tr>
<td>NO</td>
<td>Inadequate resource</td>
<td>16.4%</td>
</tr>
<tr>
<td>NO</td>
<td>Lack of support from top management</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

Source: Researcher, 2012

The research endeavored to establish the best three organizational factors in order of importance for adoption and decline of modern BIS. Table 4.2 reveals that most firms were motivated to adopt modern business information systems after considering the usefulness of the innovation as indicated by 23.9% of the respondents. Top Management support ranked second as shown by 23.9% of the respondents while anticipated ease of use ranked third (14.9% of the respondents). Size of the firm was a significant factor influencing adoption as indicated by 26% of adopters and 9% of decliners. These findings find congruence to study by Saffu et al., (2007).
Majority (23.9%) of the adopters thought that the usefulness of the innovation was the best factor, 14.9% thought that the anticipated ease of use came first 20.8% thought that company size and top management support came first. While considering the decliners, 16.4% pointed out inadequate resources at the firm level as the greatest hindrance to adoption (Table 4.2). Majority of the adopters further pointed top management support as the second most important factor for adoption with majority from the decliner firms pointing out lack of technical support (Table 4.2). Size of the firm was a factor that was common to both groups as shown in Figures 4.7-4.9. Although all organizational factors were insignificant in the prediction of BIS adoption, they all took up positive coefficients implying their positive association with adoption. Top management support, usefulness of the innovation and anticipated ease of use took up comparable coefficient values of 42.406 across and odds ratios of 26 implying equal magnitude in their impact on adoption. Appendix IV.
Figure 4.7. Organization factor versus adoption of BIS (1st rank)

Source: Researcher, 2012
Figure 4.8. Organization factor versus adoption of BIS (This bar chart explains the second most important motivating factors to adopt electronic devices)

Source: (Researcher, 2012)
Figure 4.9. Organization factor versus adoption of BIS (this graph shows the 3rd set of best factors as highlighted by respondents)

Environment

A two predictor logit model was fitted to evaluate the contribution of environmental factors in the likelihood that a firm adopted or declined modern BIS. The model fit was statistically significant ($\chi^2=59.23$, p=0.000, df=6). Model $R^2$ of 0.825 indicated a fairly strong relationship between prediction and grouping. See Appendix 3.

The mode of effecting statutory payments was not a significant predictor of adoption as indicated by 43.3% of the respondents from adopter firms who had effected their statutory payments electronically, 14.9% manually whereas 20.9% of the respondents from decliner firms who had effected their statutory payments manually and 17.9% of the respondents were not sure which mode of payment their company used. The
reference category for the model was the electronic mode of payment. For every one unit increases in manual payment mode, the odds was 1.02 times as much. The odds of those who were not sure which mode they used to effect statutory payments was 0.951 relative to electronic mode. Manual mode of payment was positively associated with adoption (β= 0.189) while the ‘not sure’ category was negatively associated with adoption (β= -0.050).

Table 4.8 Test of level of adoption of BIS re-Statutory payments

<table>
<thead>
<tr>
<th>Mode of Statutory payments</th>
<th>Has the company Fully adopted modern BIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Electronically</td>
<td>3.0</td>
</tr>
<tr>
<td>Manually</td>
<td>20.9</td>
</tr>
<tr>
<td>Not sure</td>
<td>7.5</td>
</tr>
<tr>
<td>Total</td>
<td>31.3</td>
</tr>
</tbody>
</table>

Source: Researcher, 2012

With regard to the factor that motivated the firm to adopt or decline the use of electronic weighing equipment and other electronic equipment, it was observed that the need for change with the changing times influenced most tea firms to adopt the use of electronic devices in the field and other departments as indicated by 38.8% of the respondents. 16.4% of the respondents felt that influence from TRFK, EATTA and TBK ranked highest while 10.4% thought that competition from the neighboring firms was the highest ranking factor. The second highest contributor for the use of electronic devices in the firm was thought to be influence by TRFK, EATTA and TBK as indicated by 41.79% of the respondents (see Figure 4.10-4.11). In the two predictor logit model earlier mentioned, the motivating factor for the use of
electronic devices was a significant predictor of adoption (P=0.046). With competition from other firms used as the reference category, Influence by TRFK, EATTA and TBK had positive coefficient of 19.282 implying a higher propensity for adoption. The factor was however not a significant predictor of adoption ($\chi^2=2.53E-6$, $p=0.999$, df=1). Changing times and the need for paradigm shift had positive coefficient of 1.310 implying a positive association with adoption. The factor was not statistically significant in the prediction of BIS adoption ($\chi^2= 0.763$, $p=0.382$, df=1). The odds for changing times was 3.708 relative to the reference category implying that this factor increased the chances for adoption by 3.708 times. The factor “Not sure” was a significant predictor of adoption ($\chi^2=4.897$, $P=0.027$, df=1) and had coefficient of -3.285 which implied negative association with adoption. In other words, every respondent who was not sure of the factor which motivated the firm to adopt the use of electronic gadgets in the firm decreased adoption by 0.037 times (Appendix IV).
Figure 4.10. Environmental factors versus adoption (1st rank)

Source: Researcher, 2012

Figure 4.11. Environmental factors versus adoption of BIS (this graph relates to the 2nd best factors as seen by respondents)

Source: (Researcher, 2012)
4.2 Discussion of the Findings

4.2.1. Demographics and study variables

There were six demographics namely; gender, job position, years of service, age, education and department. These also doubled up as predictors for one of the four variables, management technical orientation.

4.2.1.1 Gender

There was a fair representation of gender 68.7% (male) and 31.3% (female), of which 15% were diploma and bachelor’s degree holders and the remaining percentage had other qualifications. Women represented 17.9% of the middle and senior positions in the organizations. The findings give an indication of equal opportunity and gender representation in both genders in the organizations. Table 4.1

4.2.1.2 Job position

There were 62.7% of respondents in the middle (29.9%) and senior (32.8%) positions respectively. This representation was within our expectation.

4.2.1.3 Years of service

85%(57/67) of the respondents were those who have been in employ for 2 years and above and made up the percentage that was important for the study. 24% were in senior positions and 25.5% were in middle positions, while the bulk of 35.5% were in the supervisory positions. The inclination of a huge percentage of those in employ being in supervisory positions rather than the mid/senior positions tended to give a better reason as to why years of service tended to have a negative effect in adoption of BIS in only a certain category of employees. Chuchuen et al., (2010).
4.2.1.4 Age
62.6% of the respondents were between the age of 30 -50 years, a significant percentage of the respondents and likely determinant of BIS adoption.

4.2.1.5 Education
62.7% of respondents had a rich educational background with Diploma and above and others comprising 37.3% doing professional courses such as CPA and others. Senior managers made up of 19.4% of the proportion having either bachelors or above, an indication of a rich background of people who are aware of what is best for the organization, and thus having a higher likelihood to adopt new innovations they feel would make their work smarter. Table 4.4

4.2.1.6 Department
58.21 % were from accounts/administration, with field and factory production making up for only 30%. The remaining percentage comprised engineering and IT departments. This is a familiar set up across the organizations in the world where administrators are more often than not the majority, and also considering the fact that the top management of many organizations prefer to have those with more of managerial skills and only little of the specific business skills.

4.2.2. Management technical orientation
The findings revealed that management technical orientation was statistically significant and the Nagelkerke’s $R^2$ of 0.519 is an indication that out of the results obtained, the model did explain up to 51.9% of the variable.

Though none of the individual predictors was significant (none had $p<0.05$), the findings imply that gender was not a significant factor in BIS adoption, notwithstanding the fact that there was a positive association as indicated in our findings ($\beta=0.96, \text{Exp}(b)=2.613$). Appendix IV.
Job position was an insignificant predictor in BIS adoption in two categories of employment namely middle management and supervisors having a negative indication ($\beta = -0.802$, $\beta = -5.059$) respectively and a positive relationship with senior management as revealed by an Exp (b) of .448 against that of supervision at .006. 

Table 4.2 reveals the high positive response of 23.9% and 25.4% for senior and middle management respectively and high negative response 17.9 %( supervisors), we can deduce supervisors were more of decliners while senior and middle managers were more of adopters. Appendix IV. 

Findings on years of experience indicated that those who had been in employ from 2-5 years and 6-10 years were more likely to adopt BIS than those who had been in employ for over 10years. This does not concur with empirical studies (Weerasinghe et al.,2012) who indicated that age and work experience have a positive implication on BIS adoption. The reason being that in this study those who made up the bulk of 10years an over happen to be supervisors who had a problem with attitude change towards BIS adoption. One clear reason on the discrepancy is the fact that while Weeransinghe et al.(2012) sampled only managers responsible with ICT, our study on the other end included supervisors who were using ICT but not responsible for its use. 

Findings in our study reveal that age, though not a significant predictor, had a higher propensity(46.27%) to adopt BIS by those between age group(30-50 years), and lower propensity(13.43%) in the age group (50 years and above). This was against our expectation. According to Weerasinghe et al.,(2012) ICT adoption in the Sri Lankan corporate tea sector was higher in the age group 26-59 years. While we agree that those who have worked in an organization for long and have correspondingly aged in the organization would be more knowledgeable towards their business process needs
and thus the high adoption rate than the young who though knowledgeable have yet to settle and know what their real requirements for the firm.

Education was not a significant predictor as informed by the p value of 0.64. The nature of the industry culture is such that it is not academic driven, but rather skill driven and thus the high percentage of supervisors (37.3%) dominating in the diploma and others category.

Department had a p value of 0.732, implying that there was no significance in the variable. Accounts/administration, field and factory production respectively had a moderately high number of respondents for adoption of BIS i.e. 35.8%, 13.4% and 9% respectively.

4.2.3 Resource availability

There were two predictors tested in resource availability, namely: how easy or difficult the firm could source resources and two naming of two resources by rank that the respondents believed were of high importance in assisting a firm adopt BIS. The full model fit results ($\chi^2=2377, p=0.000, df=6$) imply that there was a high significance of the variable to the study, and the Nagelkerke’s $R^2$ of 0.812 reaffirms that the variable is explained by 81.2% of the logit model.

With an overall prediction of 91% (Yes 93.5% and No 85.7%) we confirm that the positive results to our expectations.

Where there were financial resources the coefficient showed $+20.605$ and $-20.012$ where there were no financial resources (resource poverty). In Saffu et al., (2007) their findings from empirical study shows, “that financial and technological resources as factors that are prime determinants influencing e-commerce adoption.” This concurs with our findings.
These results confirm that perceived usefulness (PU) and perceived ease of use (PEOU), as two attitudes that were predictors’ respondents perceived to have a positive effect in BIS adoption. This contradicts Lee et al., 2011 who reveals that complexity could have a significant positive effect on perceived usefulness. The argument crystalizes by noting that, “e-learning systems perceived to be of higher complexity by employees knowledgeable in information technology are more often taken up by them (IT team) for the benefit of the company.”

4.2.4. Organization

The full model test against a constant only model was statistically significant ($\chi^2=37.849, p=0.000, df=4$) implying that the predictors as a set reliably distinguish between adopters and non-adopters and Nagelkerke’s R$^2$ of 0.606 reaffirms that the variable is explained by 60.6% of the model.

Prediction success overall was 77.6% (100% for adoption and 28.6% for decliners).

Usefulness of innovation (23.9%), top management support through funding (23.9%), company size and structure (20.8%) and anticipated ease of use (14.9%) respectively ranked first as the set of factors that respondents felt motivated them to adopt BIS in the firm. These results concur with those of Saffu et al., 2007 who found perceived usefulness as the most significant factor influencing e-commerce adoption, followed by ease of use and compatibility. While in their study they had what we had in our study as top management support, as “organizational readiness”.

Contrastingly, Chong et al., 2009 revealed that usefulness of the innovation was the least important factor in motivating BIS adoption. This diversion from our expectation can be revealed in the type of theory used by Chong et al., 2009 who used innovation of diffusion theory in isolation while this study was a mix of TAM, TOE and IDT.
4.2.5. Environment

The full model test against a constant only model was statistically significant ($\chi^2=59.237$, $p=0.000$, df =6), and a Nagelkerke’s $R^2$ of 0.825 emphasized that this variable was explained by the model at a level of 82.5%. There were two predictors tested in environment namely; mode of payment of statutory deductions and secondly the factors the respondent expected to motivate the firms to adopt the use of electronic devices.

Findings were as to our expectation with those who were not sure of the type of statutory payment mode used and those whose firms were yet to adopt BIS respectively having a negative effect on BIS adoption.

Notably “competition from neighboring firms” ($p=0.046$) and “not sure” ($p=0.027$) were significant predictors in the variable in determining the level of BIS diffusion, even though latter negatively.

Ghobakhloo et al., 2011 shares with the researcher the same perspective in their research and reveals that external pressure was the most important factor positively affecting the level of IT adoption in their study, followed by others of which competitive pressure was amongst one of them.

Chong et al., 2009 further upholds our finds in their research by confirming that external environment has a significant and positive relationship with e-commerce adoption and that companies with higher adoption rate of e-commerce have been proved to have pressure by their business partners and the industry’s demand into adopting e-commerce.

The results of negative significance as a result of those who were not sure, are as per our expectation and are corroborated by Chechen et al. (, 2011) who reveal that since customer knowledge to e-commerce usage, the customer who knows well the e-
commerce will have higher expectations to have e-CRM adoption, and that who has little knowledge will have a negative level of adoption as their expectations are low.

4.3 Interpretation of Findings

This findings show that large organizations and multi-national tea firms are focused toward BIS adoption. The factors affecting BIS adoption were namely; environment, resource availability, organization and management technical orientation and based on the findings from the logit model there is a clear positive leaning towards BIS adoption than non-adoption of BIS The Nagelkerke’s $R^2$ was lowest at 0.519 (for management technical orientation) and the highest at 0.815 (for environmental factors) respectively, a confirmation of the fact that the model well explained our findings and the level of reliability is significant. Furthermore the findings reveal that looking on individual independent variables, the full model against a constant only model for all these variables were statistically significant.
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary
The study focused on the determinants of business information systems adoption in selected tea firms, in Nandi Hills, Nandi County. This study employed explorative research design to analyze four variables namely; management technical orientation, resource availability, environment and organization. With the help of three theories of innovation namely diffusion of innovation, technology acceptance model and technology, organization, environment, a logistic model was formulated to determine the factors affecting BIS adoption. Descriptive statistics and Statistical Packages for Social Sciences were also used to determine the factors that influence business information systems adoption in the organization.

Data was collected from three categories of employees from large and multinational tea firms in Nandi Hills using purposive sampling method.

The study reveals that out of the 67 respondents in the study 68.7% (46/67) were male and a similar percentage (68.7%) of respondents responded positively to business information system adoption. The employees viewed environment, resource availability, organization and management technical orientation respectively as the factors in that order as the important factors that influence business information systems adoption.

5.2 Conclusions
The overall objective of the study was to determine the factors that affect business information systems adoption in the selected tea firms.
It can be concluded that employees perceive environment, resource availability, organization and management technical orientation as the factors that influence BIS adoption.

However of all the four variables tested environment ranked first while management technical orientation ranked last. Resource availability ranked second while organization ranked second to last. These results indicate though BIS adoption perception was uniform in groups, there was more affinity for better adoption where organizations were large in size and at the same time the top management was willing to fund new business information systems projects. This is supported by (Barbosa et al., 2010) as in “the size of companies has been referred to in the literature as an influencing factor that drives companies to adoption of new technologies and innovations, where large organizations are often under pressure to improve performance, which makes them continuously seek innovative solutions.”

The study results confirmed that those in top management were more often than not been in company service for long (over 10 years), and matured in age (over 40 years) and as such were more focused and duly aware of the business requirements and such positively supported new innovations.

5.3 Recommendations

The results of this study should be deduced taking consideration several limitations. First, although the respondents sampled were adequate for the purpose of this study, it cannot be considered representative to the general population. This limits the generalization of results. This research, revealed a high response rate for those who believed that perceived ease of use and perceived usefulness were paramount in ensuring better diffusion rate in BIS. The researcher recommends tackling
implementations of new and stalled projects by taking these two factors as paramount in the success rate of that project.

Secondly the study however confirmed that there is a real need to have paradigm shift by adopting new business information systems, and reasons as to why these were not achievable are unclear, and should thus be the focus to be addressed to achieve good levels of successful BIS adoption.

Thirdly, the study revealed contrary to our empirical studies expectations that young employees of ages 25-40 years would be more than willing to adopt BIS than age group 41-50 years. This was not the case and our recommendation is that project implementation teams need be made up of top management and age group 41-50 years who tend to be more focused and specific to the goals of the firm.

5.4 Further research

Firstly this research had been conducted in Nandi Hills and future research should be carried out to investigate whether the results from the research would be consistent with findings from other tea growing regions of Kenya or even other countries and in various industries. Future studies can focus on conducting a multi-country comparison to test the influence of moderating factors such as the culture from the countries.

Secondly the research was carried out under a matrix of three theories namely, diffusion of innovation theory, technology acceptance model and technology, organization, environment respectively. The research did not delve deeply into the effects of inter-relationship of the above theories in the context of testing their diffusion rate capabilities. We would not categorically pin point, which one or which ones combined do clearly explain diffusion of BIS in firms, and further research on this area would be welcome.
Finally, there may be other factors that influence business information systems adoption. The study was focused on the internal and external factors affecting BIS adoption testing four principal variables whose individual drivers may not be similar to those in earlier empirical research, thus need for future research. The study did not focus on the inter-relationship between the four principal variables on the way they affect BIS adoption and this is another area where further research would be welcome.
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Ghabakhloo M., Benitez-Amado, J., Arias-Aranda, D., (2011): Reasons for Information technology adoption and sophistication within manufacturing SME’s, POMS 22nd Annual Conference; Operations management: The enabling link Reno, Nevada, USA.


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APPENDIX I: CONSENT

I, Odingo Robert Ouko, am currently carrying out research for the degree of Master of Business Administration in Finance Operations, through the School of Business at Kenyatta University, Nairobi, Kenya. The objective for the study is to examine, determinants on BIS adoption in business operations. The results will be invaluable in developing both new and stalled projects in BIS at the organization level.

I would like to invite you to be part of my M.B.A study, “Determinants of business information systems (BIS) adoption in business operations”. Your assistance in this matter will lead to a greater understanding of the adoption of business information systems adoption and help us find out what could be recommended or improved in the Nandi County large scale tea growers.

For this purpose a questionnaire survey will be used for my research with the people who have a knowledge and use and make decisions based on these systems.

Information provided will be for academic research only and will be treated with utmost confidentiality.

The following are a set of questions and statements that will take you less than 15 minutes to respond to for purposes of this study.

Thank you very much for your time.
APPENDIX II: QUESTIONNAIRE

Kindly fill in the spaces (………….) and tick in the box (√) appropriate.

SECTION I

General Information

1. Gender:  Male  Female

2. What is your Job position?
   Senior Manager  
   Middle Manager  
   Supervisor  

3. How many years have you been in employment in this company?  
   16 years and over  
   11-15 years  
   6-10 years  
   3-5 years  
   0-2 years  

4. How old are you?

Over 50 years
40-50 years
30-39 years
20-29 years

5. What are your education/academic background?

Masters/Phd
Bachelors
Diploma
Other

6. Which department do you work in?

Accounts/Admin.
Field Production
Factory Production
IT

7. Has the company fully adopted BIS?

Yes
No
SECTION II

The following are statements about resource availability, environment and organization. Please Tick (√) on the space provided to indicate your choice for each of the statement listed below.

A. Resource availability

1. Which resources do you think were available to enable the firm adopt BIS?
   - Technology resources
   - Financial resources
   - Other support resources
   - Technology and financial resources
   - Finance and other support resources
   - Technology and other support resources
   - Technology, finance and other support resources

2. How difficult is it for the firm to find other resources like people and time?
   - Very Difficult
   - Difficult
   - Not Difficult
B. Environment

1. How does your firm effect payment of statutory payments (NHIF, NSSF, and PAYE)?

   - Electronically
   - Manually
   - Not Sure

2. How would you rank the two best factors that motivated your firm to adopt the use information systems in various departments?

   - Competition from neighboring firms
   - Influence by TRFK, EATTA, TBK
   - Changing times and need for paradigm shift
   - Not sure
   - The firm is yet to adopt the use of electronic devices

C. Organization

1. Which three factors in order of importance best explains what motivated your firm to adopt BIS?

   - Company size and structure
   - Top management support through funding
   - Top management adopted BIS and encouraged others to do so
   - The usefulness of the innovation
   - The anticipated ease of use
   - Lack of technical support
   - Inadequate resources
I wish to appreciate your participation in this exercise and particularly for taking your time to fill in the questionnaire. Thank you!

Please feel free to contact me via email bobouko994@gmail.com or tel+254722610973 or my lead supervisor Dr. David M Nzuki via email nzukidave@yahoo.com or tel +254715219920.
APPENDIX III: INTERVIEW SCHEDULE FOR MANAGEMENT RESPONSIBLE TO BUSINESS INFORMATION SYSTEMS INNOVATIONS

Section A- General
Title of Occupation…………………………
Date of Interview…………………………

Section B
1. What are your specific duties in the organization?
........................................................................................................................................

2. How long have you been performing the specific role of implementing new business information Systems?
.................................................................................................

3. What is the main reason that motivated the company to pursue the said innovations?
........................................................................................................................................

4. Has the introduction of new business information systems of operations in the company resulted to improvements of systems that were previously in place?
........................................................................................................................................

5. Are there benefits to the organization and individual level as a result of introducing new BIS (e.g. internet/electronic leaf weighment/RFID/new payroll or accounting system etc.) resulted in any benefits? If yes, what are five major benefits of BIS adoption in order of priority?
........................................................................................................................................

6. Is the company keen in introducing any new innovation that they have a feeling is complex in nature?
........................................................................................................................................

7. What drives the company to ensure diffusion of new business information systems?
........................................................................................................................................

8. Do you believe that the use of technology has improved the quality of decision making in the organization? Comment.
APPENDIX IV RESULTS OF LOGISTIC REGRESSION

Appendix 1) Management technical orientation

### Omnibus Tests of Model Coefficients

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### Appendix 3) Environmental Factors

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<td>.127</td>
<td>6.782</td>
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Appendix 4) Organizational factors

Omnibus Tests of Model Coefficients

<table>
<thead>
<tr>
<th>Omnibus Tests of Model Coefficients</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Step</td>
<td>37.849</td>
<td>4</td>
<td>.000</td>
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<tr>
<td>Block</td>
<td>37.849</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>Model</td>
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<td>.000</td>
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Model Summary

<table>
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<tr>
<th>Model Summary</th>
<th>-2 Log likelihood</th>
<th>Cox &amp; Snell R Square</th>
<th>Nagelkerke R Square</th>
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<tr>
<td>Step 1</td>
<td>45.475a</td>
<td>.432</td>
<td>.606</td>
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### Classification Table

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<tr>
<th>Observed Has the company Fully adopted BIS</th>
<th>Predicted</th>
<th>Percentage Correct</th>
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<td>Has the company Fully adopted BIS</td>
<td>No</td>
<td>6</td>
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<tr>
<td></td>
<td>Yes</td>
<td>15</td>
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<tr>
<td>Overall Percentage</td>
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<table>
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<th></th>
<th>Percentage</th>
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<tr>
<td>No</td>
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<tr>
<td>Yes</td>
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### Variables in the Equation

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<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald df</th>
<th>Sig.</th>
<th>Exp(B)</th>
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<tbody>
<tr>
<td>Organizational factor</td>
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<tr>
<td>Top management adopted</td>
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<td>4.341E-4</td>
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<td>The usefulness of the innovation</td>
<td>42.06</td>
<td>4.341E-4</td>
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<td>.999</td>
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<td>Anticipated ease of use</td>
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<td>1.827E-4</td>
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