Addis Ababa University
College Of Business and Economics
Department Of Management
EMBA PROGRAM

INFORMATION COMMINICATION TECHNOLOGY (ICT) ADOPTION IN UPAREZ BUSINESS PLC

A thesis submitted in partial fulfillment of the requirements for the degree of Executive Master of Business Administration.

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A**ddis Ababa, Ethiopia**

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Advisor_____ Signature_____ Date_____

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Abstract

Information Communication Technology has become a significant expression of human activity that has contributed and still contributes much to countries' economies, social welfare, and cultural heritage.

Small and medium enterprises (SMEs) competitiveness is basically affected by political, economic, social, technological, legal and environmental factors. Information Communication Technology (ICT) as part of technologies, it is one of the contemporary factor affecting different areas of business organizations towards their competitiveness.

UPAREZ Business PLC is a SME. It has invested a lot on ICT to maintain its competitiveness. However, Some SBU and department don't know the potential factors affecting ICT adoption and have not used any formal ICT adoption model. ICT use (utilization) varied among SBUs and departments.

Thus, the objective of this research is to identify factors affecting ICT adoption towards the competitiveness SMEs in the case of UPAREZ and develop a custom made model for the company with particular emphasis on influence of ICT on competitiveness.

In order to achieve the above objective interview, questioner and document observation were used as an instrument for data collection, and mixed research methodology were implemented for data analysis.

Contrary to the common understanding of SMEs, UPAREZ has invested a lot in ICT. Factors top management/owner support on ICT, centralized business management, owners/manager's ICT awareness, improved market performance, ease of use, speed up business processes, size (number of sales outlet or customer), increased efficiency and effectiveness, government's regulation and law, improved and quality service delivery, quality of IS systems and capabilities, link internal and external business processes, reduced business costs and supplier collaboration were the most impotent enabling factors affecting the ICT adoption.

The barriers to adopt the ICT were of inadequate ICT strategy, lack of government incentive, lack of perceived economic or other benefits to the unit, reluctance of personnel to use ICT, lack of localization-Amharic user interface, lack of training& consulting, new versions of existing software introduced too often (support fee) and expensive hardware/software, which creates inconsistent ICT adoption in strategic business units (SBUs) and departments on UPAREZ.

The company has to minimizing the resistant barriers and exploit the enabling factors of ICT adoption to reinforce its competitiveness through ICT.

The overall factors, barriers and perceptions affecting ICT adoption were identified and a custom made ICT adoption model for the company has been developed. The company and CT suppliers could able use the model by considering their existing contexts.

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Acronyms

ETC……	Ethiopian Telecommunication Corporation
ICT……..	Information Communication Technology
ISP……..	Internet Service Provider
IT……..	Information Technology
LAN……	Local Area Network
WAN……	Wide Area Network
VAT……	Value Added Tax
SMEs……..	Small and Medium Enterprises
DST……	Distribution
RAD……	Requirement Analysis Document
SBU……	Strategic Business Unit
DSS……	Decision Support Systems
NIC……	Network Interface Card
PC……..	Personal Computer
ERP ……..	Enterprise Resource Planning Systems
KMS……..	Knowledge management Systems
DBMS……..	Database Managements System
R&D……..	Research and Development
SG……..	Sustainable Growth
CON……..	Construction
TRNS……..	Transport
HO……..	Head Office
TRD……..	Trading
POS ……..	Point of Sale
INV……..	Inventory Management System
PRDN ……..	Production Management System
HRM ……..	HRM Management System
PMS ……..	Property Management System
FleetMS ……..	Fleet Management System
ACCT……..	Accounting Management System
Doc Sync ……..	Document Synchronization
CRM ……..	Customer Relation Management
SCM ……..	Supply Chain Management
TCP……..	Transmission Control Protocol
IP ……..	Internet Protocol
DSL……..	Digital Subscriber Line
QHT……..	Quick Heal Technology
UOM……..	Unit of Measurement
PO……..	Profit Optimization
MGT ……..	Management

1. Introduction

1.1 Background of the Study

After 1991 deregulation of Ethiopian economy from command to free market, the involvement of small and medium enterprises (SMEs) is grow time to time. Although the involvement gets more, their contribution to the national economy growth is not considerable (IMF, 2014). This is basically due to inability to process and utilize market information, either due to lack of information or access to these information, as well as an inability to appropriately use it in a timely fashion if it is obtained has become another challenge for private sector development (Alemayehu, 2008).

Small and medium enterprises competitiveness is basically affected by political, economic, social, technological, legal and environmental factors (Porter, 1985). Information Communication Technology (ICT) is one of the contemporary factor affecting different areas of business organizations by:

- Enabling real-time communication for purchase and supply
- Capturing Customers' needs trend
- Changing way of production and innovation
- Enhancing customer service, selling and distribution channel
- Increasing management flexibility and integration
- Redefining organizational boundaries between customers, supplier and employees (White and Bruton, 2009).

UPAREZ Established on March 2011, was initially engaged retailing pharmaceuticals. Besides it was trading of other fast moving consumable goods (super market items). By January 2012, company went on importing timber and related items, and giving vehicle rental service. By the year 2013, the demand of vehicle rental service was high day by day. Realizing that was the opportunity and there was enough capability, company carried out purchase of trucks and recruiting staff to give transport service. In January 2014, company went on doing construction focusing on building finishing works and landscaping.

Now, UPAREZ is involved in different strategic business units (SBUs) like construction (finishing and landscaping works), trading (pharmacy, supermarket items and timber) and transport service. It has also a plan to invest in ICT in Ethiopian and export gem stone by the next two years. The company has the following vision, mission and corporate principle.

Vision
UPAREZ vision is playing a significant role in the national economy development (Construction, trading, transport and ICT sector) by reaching every part of the country.

Mission
UPAREZ Mission is to be a leading Business company the above sectors in Ethiopia by supplying reliable product and service with reasonable price.

Corporate Principle
With the aim of becoming a company trusted by nationwide customers, we are committed to making continuous innovations to provide superior products and services of the best technology and the highest quality to meet client's needs.

UPAREZ as SME, currently has a capital of 17.5 million and an employee of more than 154 along different products/services with unknown market share.

1.2 Statement of the Problems

UPAREZ has been made significant investment on ICT to enhance the performance of SBUs through the influence of ICT. ICT has influence on flexibility/ adaptability of product/services, reduction of operational cost, efficiency of business processes, ease of structuring and restructuring, quality of customer service, productivity of employees, motivation and development of staff, growth of revenue and competitive advantage.
Although influence of ICT on the overall strategic competitiveness of business organizations is deemed to be high, technological readiness, acquisition and utilization of ICT is vary and very low among UPAREZ SBUs and departments. There are some documents that deals about some ICT related issues of the company. Company's audit and inspection periodical report had stated that underutilization of ICT is one of the reason for some SBU and departments under performance. A requirement analysis document (RAD) which prepared by ICT supplier (CNET Software Technology PLC) also stated that some SBU and department don't know the potential factors affecting ICT adoption. UPAREZ SBUs and departments have not used any formal ICT adoption model. ICT use (utilization) varied among SBUs and departments.

Researchers conducted study in the area of Ethiopian SMEs ICT adoption recommends that consistent ICT adoption among all concerned units is a core point in the effective adoption of ICT.

- Banking industry (Meseret, 2010), (Ayana, 2014), (Bisrat, 2015) and (Yalew, 2015)
- Hotel industry (Demeke, 2014)
- Transport industry (Sintayehu, 2014)
- Textile& Leather industry (Kumlachew, 2015)

There are developed ICT adoption models which are not a feasible solution because most of ICT adoption models are developed by taking in to consideration factors which are found to be important in large business organizations that are characterized by stabilized finance and an ICT infrastructure with good coverage and services. According to most of the ICT adoption models, the major factors were summarized as system capabilities, organization, task level, environmental, business strategies, organizational resource and management style (Meseret et al., 2010). The above list of factors has neglected some of salient features of socio-economic factors that could have a greater impact on ICT adoption by UPAREZ.

Thus, knowing the current status ICT utilization among SBUs and departments and their barriers is mandatory. Second attitude of SBUs and departments towards the influence of ICT adoption on organizational performance (competitiveness) has to be tested. Finally factors that have importance for the case of UPAREZ ICT adoption need to be identified and a custom made ICT adoption model should be created. The final output of this research is a model, which will satisfy most of the above requirements.

1.3 Research Questions

The research questions for this study will be:

1. What are the ICTs adopted in UPAREZ SBUs and departments?
2. What are the major barriers of ICT adoption in UPAREZ?
3. What are the most important factors affecting ICT adoption in UPAREZ?
4. How ICT influence UPAREZ towards its competitiveness?
5. What should be the model to adopt ICT in UPAREZ?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of this research is to identify factors affecting ICT adoption of UPAREZ and develop a custom made model the company with particular emphasis on influence of on its competitiveness through ICT.

1.4.2 Specific Objective

Specifically the aim of this research is to

1. Identify ICTs adopted on SBU and departments UPAREZ.
2. Know major barriers of ICT adoption in UPAREZ
3. Identify most important factors affecting ICT adoption in UPAREZ
4. Know the influence ICT on UPAREZ towards its competitiveness.
5. Develop a custom made ICT adoption model for UPAREZ.
6. To recommend the company and ICT supplier on ICT adoption

1.5 Significance of the study

This study is important in identifying factors affecting ICT adoption and competitiveness through ICT in UPAREZ and similar SMEs. The benefits of this study is

- Gives an evaluation of ICT adoption to the management of UPAREZ

- Provides model on ICT adoption and recommend UPAREZ on ICT enabled competitiveness.
- Gives a clue to the supplier (CNET) how to implement ICT in different SBUs and departments of UPAREZ.

1.6 Scope of the Study

ICT has many components for SMEs. This research is focused only on factors affecting adoption of information system software in UPAREZ in Addis Ababa, Ethiopia. Other types of ICT such as e-commerce, artificial intelligence enabled decision support systems (DSS) etc. are not considered in the research.

Furthermore, this research, as it is a qualitative research, doesn't answer questions like how often each factor affects ICT adoption and related to competitiveness.

Thus, the benefits of the research could be limited to SBUs and departments of UPAREZ only on identifying major barriers of ICT adoption, understanding the important factors affecting ICT and knowing the current perception of ICTs influence towards competitiveness.

1.7 Organization of the Study

Chapter I introduces the research rationale, statement of the problem, objective of the study, scope of the study and framework of the study.

Chapter **II** is a review of previous studies on SMEs development, their competitiveness and contribution to economy. However, technological competitiveness and readiness is the central point of the review. Besides their readiness, role of ICT, components of ICT and methods to acquire technology will be presented.

Chapter III presents how the research was conducted and explain the methodology used to collect and analyze the data.

Chapter IV background history, financial situation, human resource, products and service, customers and suppliers of the company will be presented and analysis of ICT adoption, comparison of ICT adoption with reference to available ICTs, factors affecting ICT adoption in UPAREZ, the current perception of ICTs influence towards competitiveness will be discussed to draw feasible lessons. Finally model for analyzing factors affecting UPAREZ ICT adoption will be developed.

In Chapter V provides summary, conclusions, research contribution/limitations of the study and some recommendations. Finally the chapter states the application of the research and suggests further studies need to be conducted.

2. Literature Review

2.1 Small and Medium Enterprises (SMEs) Overview

Business is a process of wealth creation through interaction of different production and market inputs and distributed back to the inputs themselves for utilization and creating further or different forms of wealth. The process of creating profit and wealth needs some form of organization, administration and leadership. The study of the relationship of production inputs (factors) and nature of distribution of market is managerial economics (Mcguigan, Moyer& Harris, 2011).

In managerial economics, profit-wealth is property (fixed and material), human resources and finance capital are basic (primary) inputs (factors) of production for an organization. In today's development of humankind, organization also has another input, which is entrepreneurship that play a great role as factor of production or an operators of the market (Mcguigan, Moyer& Harris, 2011). Entrepreneurship, which is a source of competiveness, is developed from of primary inputs and is key player of the market. Today, Small and Medium Enterprises (SMEs), which have a massive limitations on basic (primary) inputs (factors) of production, are more of dependent of Entrepreneurship.

The level of entrepreneurship varies across SMEs and across SBU and department with in a given SME. As a SME, developing and using entrepreneurship for competitiveness and sustainable development, needs critical creativity, debate on different strategy of competitiveness (World Bank Group, 2015).

2.2 The Role and Competitiveness of SMEs

The development level of the Entrepreneurs determines their level of involvement and roles to the economy of a country. All successful business models begin by identifying target markets-that is, what businesses one wants to enter and stay in. Physical assets, human resources, and intellectual property (like patents and licenses) sometimes limit the firm's capabilities, but business models are as unbounded as the creativity of entrepreneurial managers in finding ways to identify new opportunities (Mcguigan, Moyer& Harris, 2011). With the given overall limitations, which party (public or private) has got a better probability to unleash the latent potential? Whom has got the priority? To what extent; questions are sources of difference between parties of countries including Ethiopia.

SMEs, which are part of private sector, can have the following contribution in growth and transformation of country economy depending on the role given to them (DFID, 2014)

- They can be sources of employment (around 90% of jobs in developing countries are embedded into the private sector)
- They are vital for creating productive jobs and increasing the tax revenues
- They lead to structural change by adapting new way of working

Today, SMEs are involved in three basic sector (agriculture, industry and service) of Ethiopian economy. The performance and contribution of SMEs to the economy differs across different regime depending on their policies and strategies on involvement of private sector in the country economy (Alemayehu, 2011).

The current government of Ethiopia has labeled itself as developmental state. In current development of Ethiopian economy, even after a lot of privatization of public enterprises, the level and role of public sector is very high and appears to be continued high in sectors overlooked by private sectors. At least, the current leanings of the private sector (SMEs) towards the development of the country is another a source of argument in different parties. Due to that fact, the private sector (SMEs) has lacked proper priority and faced many limitations to unleash it's latent potential in short period of time (IMF, 2014)

However, the government of government of Ethiopia along with different international organizations has designed different private sector development (PSD) program, which will increase the role of SMEs and their competitiveness (FDRE-MOFED, 2010), (World Bank Group, 2015), (DFID, 2014).

Today, postmodern theory holds out the possibility for a liberatory, non-predatory version of capitalism, if you will, a liberatory-grand narrative. This postmodern grand narrative professes democratic governance, transparency in monitoring corporate ethics, and a revision to the surplus value equation of maximizing exploitation that favors worker rights, community sovereignty over corporations, and eco-sustainability (Burnes, 2009).

Therefore business organizations in post-modernism is not only about the production and distribution of products and services to maximize profit. However considering all the stakeholders interest, is compulsory for sustainable and environmental viability growth. SMEs, which have ultimate goal of wealth optimization, have social responsibilities beside with specific profit maximization goal.

Therefore, while developing competitiveness the following societal and environmental responsibilities and values need to be considered.

- Growth cannot be maximized for indefinite period of time. Rather it optimized in short run and in scared resources (including ecological environment)
- A value created through growth has left a gap need be filled in the long run
- The pace to fill the gap need to depend on the decomposition time length of value created in order to keep the optimized growth.
    - If the decomposition cycle of the value created is short, the pace to fill its gap could be slow-as the value comes back to its source soon
    - If the recycle-ability of the value created is possible, the pace to fill its gap should be moderate-as the value can be reused again, but still needs filling.

- If the decomposition cycle of the value created is long, the pace to fill its gap should be fast-as long craved gap starts to inflict its impact randomly to balance-in its own way-in result the growth affected adversely.
- Growth by itself is a data, information and knowledge and ICT as a source, means and end of data, information and knowledge, it is growth.

The advancement of information communication technology (ICT) provides a lot of opportunities for entrepreneurs of SMEs in data, information and knowledge gathering, storing, computing and analyzing as well as supporting decision about their resources and product/service by identifying, creating and sustaining superior competitive advantage in the SMEs. However inability to process and utilize market information, either due to lack of information or access to these information, as well as an inability to appropriately use it in a timely fashion if it is obtained has become another challenge for private sector development in Ethiopia (Alemayehu, 2008).

2.3 Information and Communication Technology (ICT) Overview

The first step in understanding ICT is started with its proper definition. ICT has variety of definition by different authors depending on their perspective.

The most comprehensive definition, however, has been attributed to (Sharif, 1987) who considers technology (ICT) as a combination of four basic components, all of which together accomplish any transformation operation. These components are:

- Production tools and facilities, referred to as object-embodied technology or *technoware*. This includes all physical facilities required for the transformation operation such as instruments, equipment, machinery, devices, structures, etc.

- Production skills and experiences referred to as person-embodied technology or *humanware*. This embraces all acquired abilities necessary for the transformation operation such as expertise, proficiencies, dexterity, creativity, diligence, and ingenuity.

- Production facts and information referred to as document-embodied technology or *inforware*. This includes all accumulated facts and figures required for the transformation activity such as designs, accounts, manuals, specifications, observations, regulations, equations, charts, theories.

- Production arrangements and linkages referred to as institution-embodied technology or orgaware. This includes all necessary arrangements for the transformation operation such as groupings, allocations, systematization, organizations, networks, management, and marketing

For the purpose of this paper ICT is defined as it is about getting, storing, analyzing and using data, information and knowledge via different communication devices/medias in order to sustain day to day life of the individuals, organizations, countries and society.

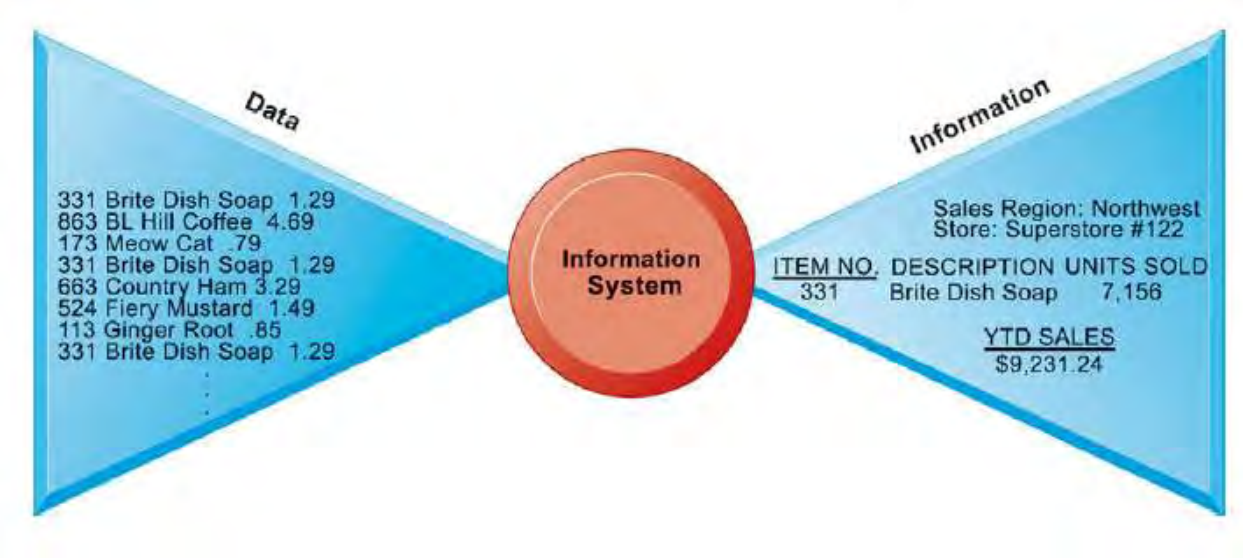


Figure 1.Data and Information

Source: (Laudon& Laudon, 2012)

The level of advancement of the communication devices/medias and their freedom of utilization, and capabilities for understanding relationship, patterns ad principles of available data, information and knowledge are mutually inclusive that one affects the other in many ways. Pushing on existing data, information, and knowledge has a probability to bring advancement in the communication devices/medias. (Laudon& Laudon, 2012) stated that investing on the communication devices/medias also creates opportunity to get the necessary data, information and knowledge-as result to understand relationship, patterns ad principles to be applied in current arena, and to be a source of data, information and knowledge for unanswered void/null.

2.4 ICT and Competitive Strategy

Competitive strategy is an integrated set of policies in each functional activity of the organization that aims to create a sustainable competitive advantage. Technological strategy (in this study ICT) is but one element of an overall competitive strategy, and thus must be consistent with and reinforced by the actions of other functional departments'. Business competitiveness is the collection of activities required to produce a product or service. These activities are supported by flows of material, information, and knowledge among the participants in business processes. Business competitiveness also refer to the unique ways in which organizations coordinate work, information, and knowledge, and the ways in which management chooses to coordinate work (Laudon& Laudon, 2012).

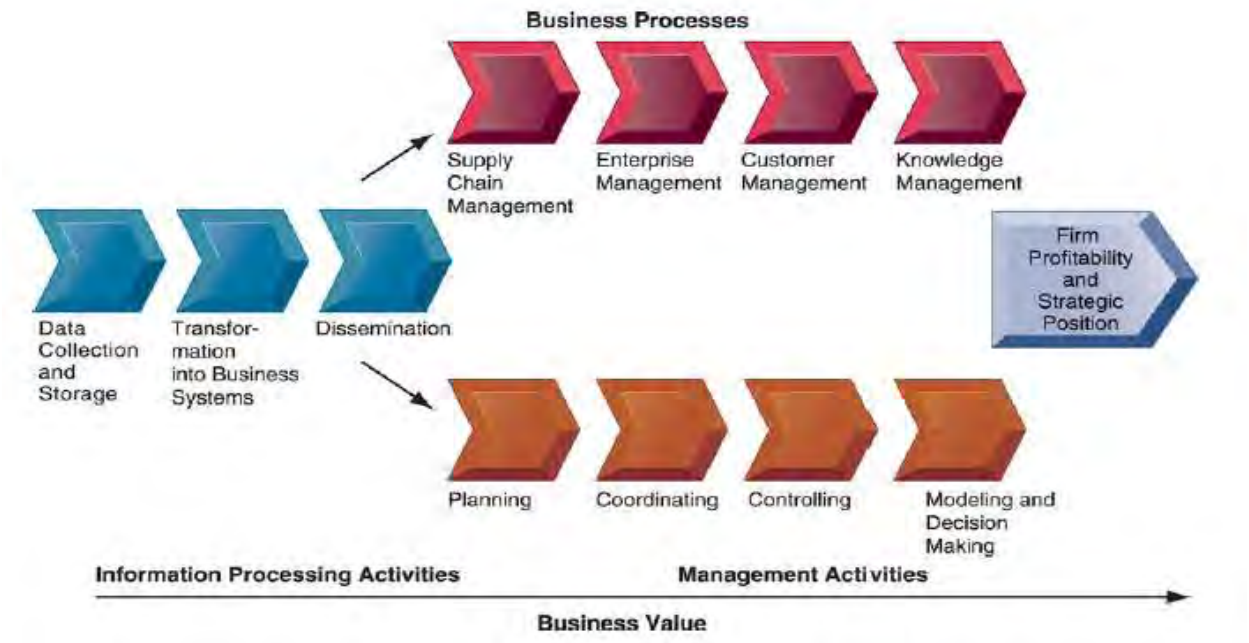


Figure 2.The Business Information Value Chain

Source (Laudon& Laudon, 2012)

Competitive strategy can lead to two broad types of competitive advantage: lower cost or differentiation (uniqueness) (Porter, 1985). The two fundamental sources of competitive advantage translate into three generic competitive strategies depending on the scope of the organization's target market within its industry:

- Overall cost leadership emphasizes producing a standardized product at a very low per unit for many buyers who are price sensitive.
- Overall differentiation refers to outputs of an organization, which are considered unique industry-wide and are addressed to many buyers who are relatively price-sensitive.
- Focus adverts to products, which fulfill the needs of particular buyers who are fewer in number in an industry.

ICT strategy is a potentially powerful vehicle with which the organization can pursue each of the three generic strategies. ICT strategy can be linked to overall competitive strategy by identifying the fundamental source and scope of competitive advantage that the ICT strategy is attempting to create or reinforce.

In other word to bring competitiveness through ICT in any organization, one must look into and find relationship in-depth into the constructs of the organization, and determines the role expected to play.

Based on its expected contribution on different sides of an organization, ICT has to be given a proper role to play.

- If it is permitted to play a role to capture needs/demands of customers, it will come-up with new idea -as result the production will be innovative.

- If it is set-upped to play a role to handle process of production, it will come-up with quality product/services with reduced cost -as result the products/service can be presented with reasonable price and satisfied the customers.
- If it is created to play a role to relate customers, handle process and measure quality along with cost saving strategy, it will come-up with competitiveness-as result the organization starts to gets its momentum and to continue to structural change, and transformed successfully.

2.5 ICT Adoption Model

Since the research has taken the objective of identifying the barriers and factors affecting ICT adoption along with building ICT adoption model, it would be appropriate to describe some of the most prominent ICT adoption models and their factors that are circulating in the academic research area related with ICT.

A number of authors have defined adoption in a variety of ways and have distinguished between adoption, diffusion, initiation, development, implementation and use.

The researcher for this study has chosen to use ‘‘adoption’’ in the limited sense so that it encompasses ‘‘acquisition and use ’’ of the technologies.

(Tornatzky and Fleischer, 2003) developed a framework that explains the decision to adopt a technological innovation by a firm is not only based on the technological consideration, but also dependent on the organizational and environmental contexts. They summed up the findings of their study as TOE framework, which has been extensively used by researchers to study technology adoption.

DIVERSE INFORMATION TECHNOLOGY ADOPTION MODELS

References	Stages/Phases					
Change Model *(Lewin, 1952)*	Unfreezing	Change (or Moving)	Refreezing			
Organisational Innovation Model *(Pierce and Delbecq, 1977)*	Initiation	Adoption	Implementation			
Four Phase Innovation Adoption Process *(Darmawan, 2001)*	Initiation	Adoption	Implementation	Evaluation		
Stages of Innovation Adoption *(Becker and Whisler, 1967)*	Stimulus	Conception	Proposal	Adoption Decision		
The Research Model *(Agarwal and Prasad, 1998)*	Awareness	Perception	Adoption Decision			
	Channel Type		Personal Innovativeness			
Organisation Innovation Adoption *(Frambach and Schillewaert, 2002)*	Awareness	Consideration	Intention	Adoption Decision	Continuous Use	User Acceptance
Innovation Adoption and Implementation *(Gallivan, 2001)*	Primary Authority Adoption Decision	Secondary Adoption and Organisational Assimilation	Organisational Acceptance And Consequences			
Innovation Adoption *(Rogers, 1995)*	Knowledge of Innovation	Attitude towards Innovation	Adoption Decision	Implementing Innovation Idea	Confirmation of Decision	
IT Adoption Model *(Dixon, 1999)*	Analysing Requirements & Assessing Capabilities	Analysing Fit of Technology	Adoption Decision	Accept for Utilisation or Upgrade Capabilities		
				Rejection		
Technology Acceptance Model *(Davis, 1989)*	Investigating the External Variables	Perceived Usefulness	Attitude Towards Technology	Behavioural Intention for Technology Acceptance	Actual System Accepted and in Use	
		Perceived Ease of Use				
Two Stage Innovation Adoption Model *(Zaltman et al. 1973)*	Primary Adoption		Secondary Adoption			
	A Firm Level Decision for Technology Acceptance		Actual Innovation Implementation and including Individual Adoption by Users			

Figure 3.IT Adoption Models Summary: Source: (Tornatzky and Fleischer, 2003)

The theory and models discussed below are to be used as a foundation for the barriers and factors to be identified and model to be built and it should be noted that all ICT adoption models are not comprehensively discussed.

2.5.1 Theory of Reasoned Action (TRA)

Theory of Reasoned Action (TRA) is a model, which has been successful in predicting and explaining the behavior of users in different spheres of influence including in researches of technology acceptance and adoption. TRA's concepts and framework is based on analysis of the difference between beliefs, attitudes, intentions, and behaviors. According to TRA, a person's action of a specified behavior is determined by the behavioral intention to perform the behavior (Sandberg and Wahlberg, 2002). On the other hand, the intention behavior is determined by the person's attitude and subjective norms concerning the behavior. Generally, TRA states the belief and attitude of a person will formulate patterns, which will guide the persons' overt actions and decisions.

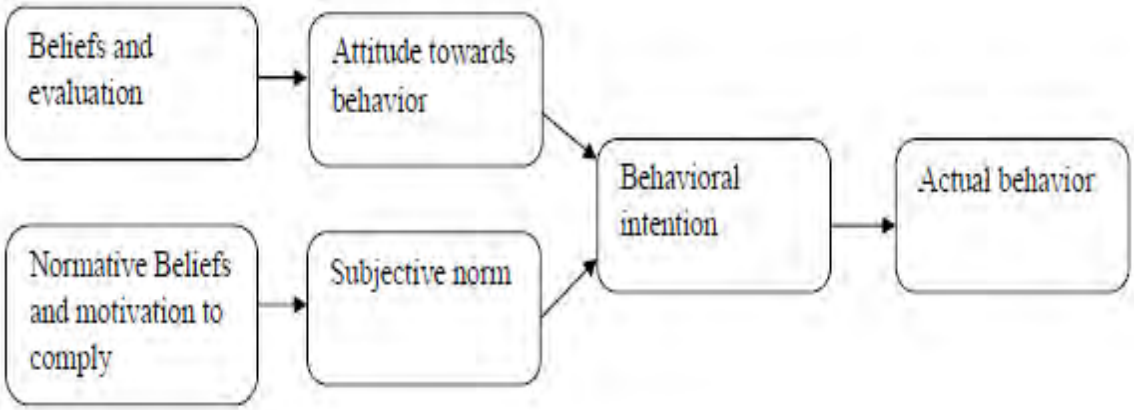


Figure 4.The Theory of Reasoned Action Model:
Source: (Sandberg and Wahlberg, 2002)

2.5.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is an information systems theory. (Bagozzi et al, 1992) argue that users accept and use new technology based on two measures, perceived usefulness and perceived ease of use. Perceived usefulness as the degree to which a person believes that using a particular system will benefit them in their job performance. In addition, perceived ease of use is the degree to which the use of the system would be free from effort. The advantage of this measure is its simplicity. The technology can have a multitude of capabilities, this is useful only if the users perceive that it is useful for their job.

However, TAM is criticized as having limited explanatory ability. It is not possible to predict using TAM if potential adopters will adopt a system based on perceived usefulness and ease of use (Chuttur 2009). Chuttur argues that TAM lacks any practical value. Furthermore, adopters of technology are influenced by many factors; some of these factors include their ability to use the technology, its affordability and its compatibility with their value and culture.

2.5.3 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology take in to consideration new factors that bear a tremendous amount of influence on the behavioral intentions and the usage of the technology. This take into account several new concepts like performance expectancy, effort expectancy, facilitating conditions, and social influence to explain the perceived usefulness and perceived ease of use (Sandberg and Wahlberg, 2002).

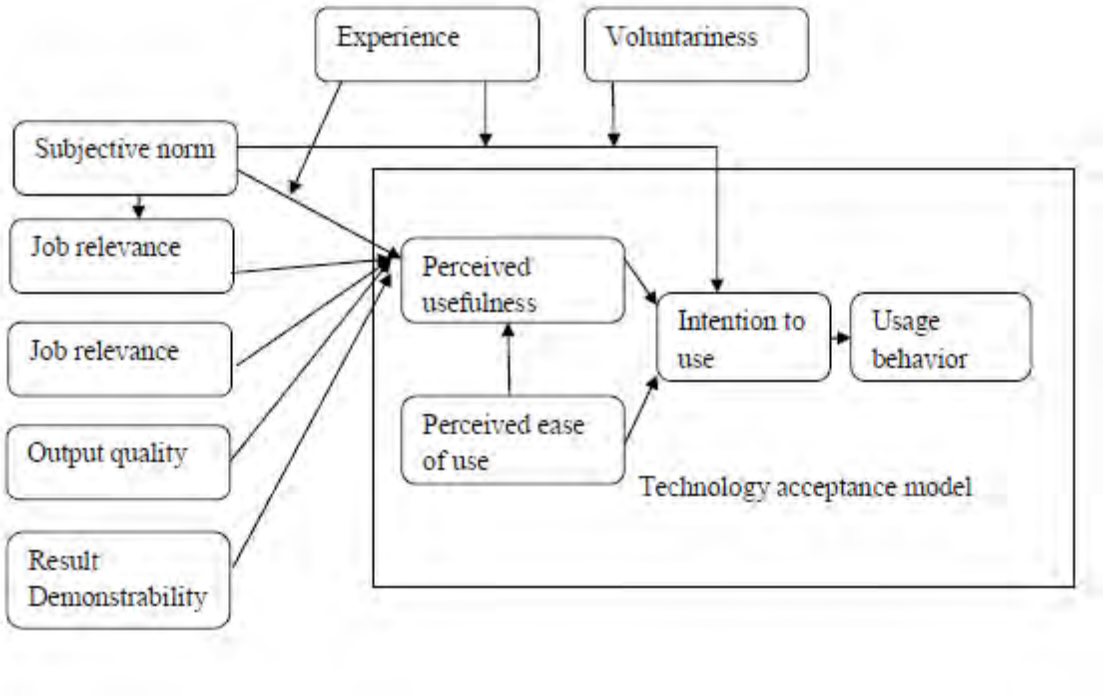


Figure 5.Unified Theory of Acceptance and Use of Technology Model:
Source: (Sandberg and Wahlberg, 2002).

2.5.4 Rogers' Diffusion of Innovation

According to (Rogers, 2003) adoption is considered as a decision to make full use of an innovation as the best course of action, and conversely, rejection is a decision not to adopt an available innovation. Furthermore, Rogers states that technology users go through five stages before they can adopt a new technology. The five stages are: (1) awareness, (2) interest, (3) evaluation, (4) trial, and (5) adoption. Thus technology adoption is the choice to acquire and use a new invention or innovation.
(Rogers, 2003) diffusion of innovation theory points out that the independent variables of diffusion are: the individual characteristics, the innovation characteristics and the social system. However, other nation-wide policies that arise from the political, economic, cultural, environmental and legal factors play a significant role in the adoption process, and create diffusion facilitating and resistance factors for the adoption of ICT.
In conclusion, Rogers' diffusion of innovation model can be used to explain about why some people or organizations are in the front of accepting and adopting innovations and why others are lagging behind. The model gives a comprehensive framework by covering almost all important features that affect adoption of an innovation.

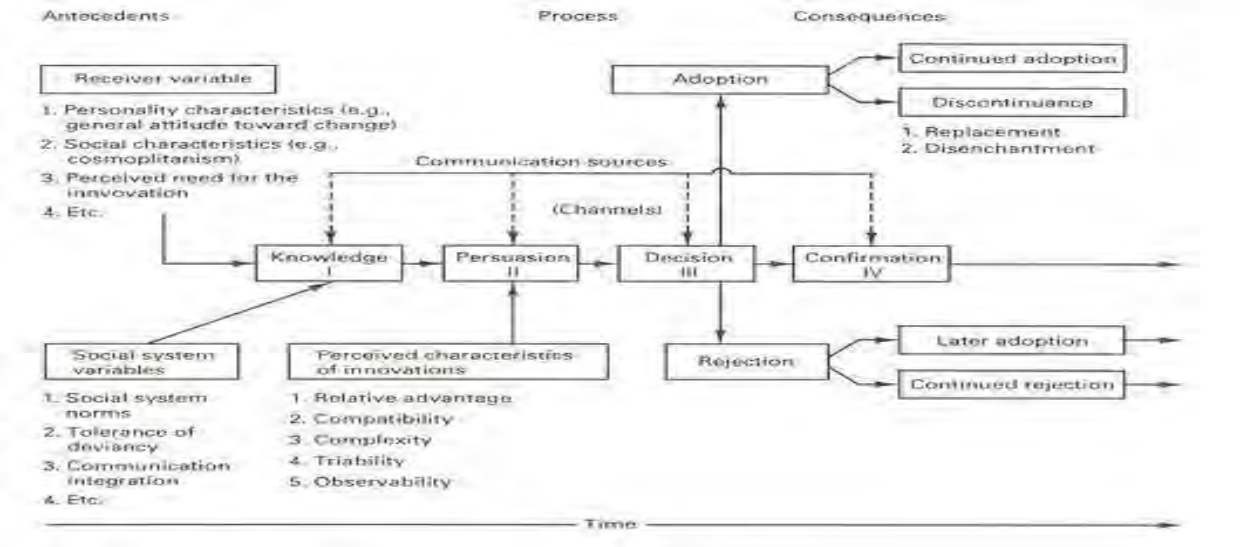


Figure 6.Rogers' Diffusion Innovation Model: Source (Roger, 2003)

2.6 Factors Affecting ICT Adoption

ICT adoption is an organization's approach to the acquisition and use of ICT. Because of the power of technological change to influence industry structure and competitive advantage, an organization's ICT strategy becomes an essential ingredient in its overall competitive strategy (Porter, 1985). Therefore, in terms of selection process, an organization must make decisions in the areas of timing of acquisition, choices, sources, R&D level, competence and funding of ICT.

Generally an ICT contains information about business strategies, an organization, the technology itself and its surrounding environment. Three basic activities—input, processing, and output—produce the information organizations need. Feedback is output returned to appropriate people or activities in the organization to evaluate and refine the input. Environmental actors, such as customers, suppliers, competitors, stockholders, and regulatory agencies, interact with the organization and its information systems and.

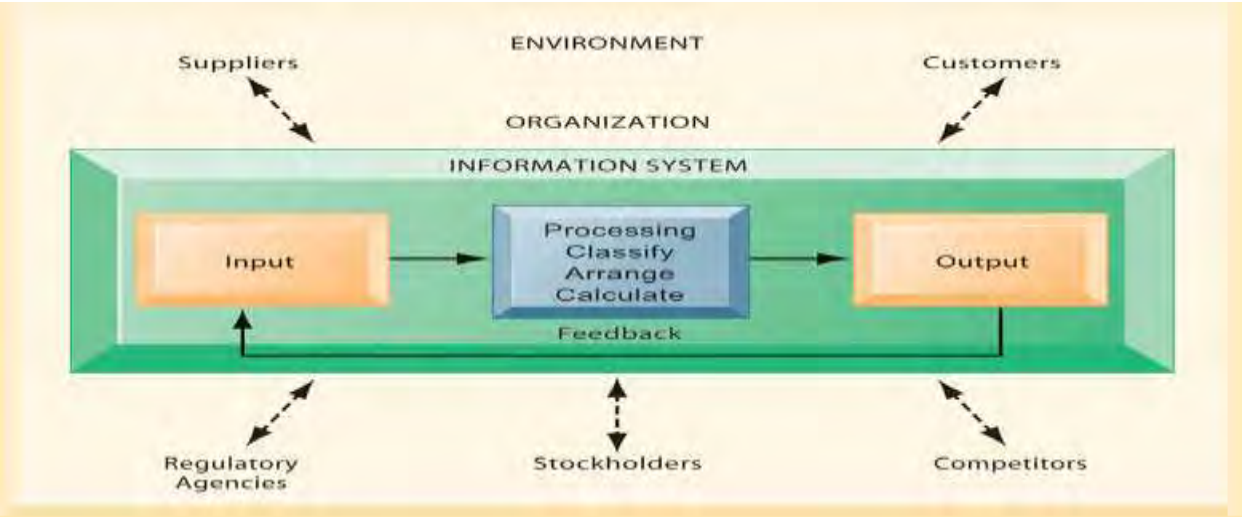


Figure 7.Functions of an Information System: Source: (Laudon& Laudon 2012)

Adoption of innovations has also mostly focused on the factors affecting adoption and diffusion of new technology. A variety of factors may affect an organizations decision to adopt and implement a particular technology. These factors can be categorized under technology, organization and environment aspects of an enterprise's context as shown in the Figure below (Oliveira and Martins, 2011).

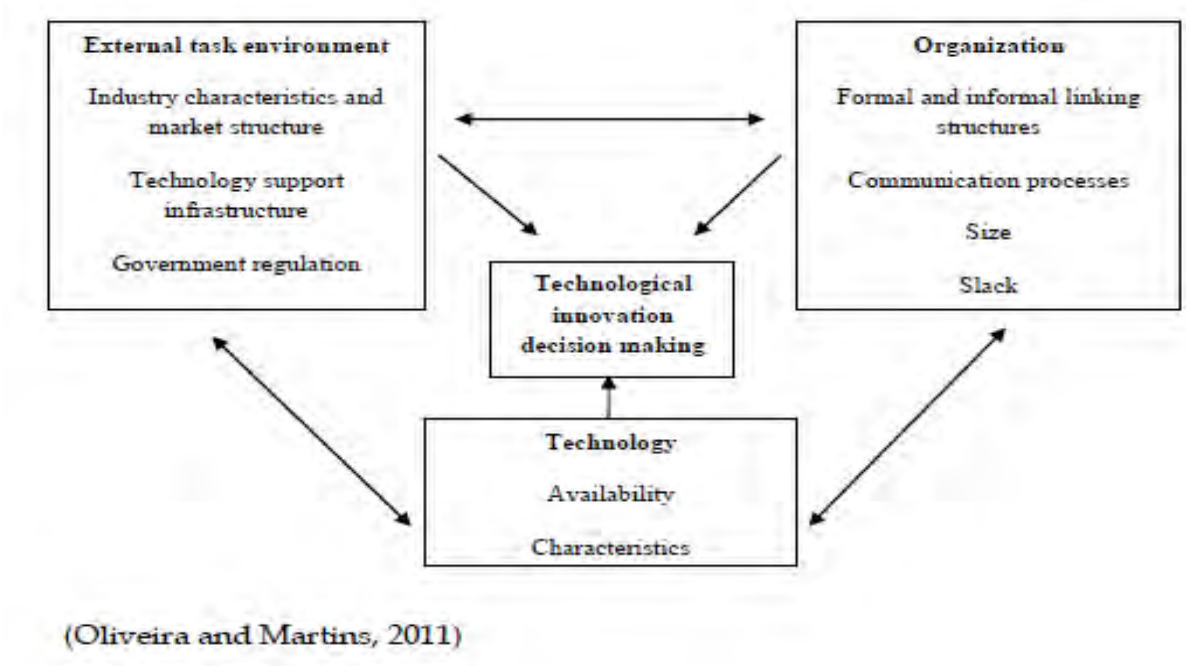


***Figure 8.Technology, Organization, and Environment Framework*:**
Source**:** (Oliveira& Martins, 2011)

There are four major categories in reviewing factors or the barriers affecting ICT adoption. These are business strategies, organizational, environmental and technological factors. The detail factors affecting ICT adoption will be discussed in the above four major categories as follow.

2.6.1 Business Strategies

The services a firm is capable of providing to its customers, suppliers, and employees are a direct function of its ICT infrastructure. Ideally, this infrastructure should support the firm's business and information systems strategy. New ICT have a powerful impact on business and ICT strategies, as well as the services that can be provided to customers.

It is known that the power of technological change to influence industry structure and competitive advantage, an organization's ICT strategy becomes an essential ingredient in its overall competitive strategy (Porter, 1985).

Organizations that have no experience of technology, or with limited exposure and experience, tend not to be innovative or early adopters of a technology. According to

(Minishi-Majanja & Kiplang'at, 2005), organizations without prior technological experience or knowledge suffer from uncertainties caused by the possible introduction of new innovation in the organization. Furthermore, early adopters are different from late adopters in many ways; for example, (Rogers, 1995) showed that early adopters are mainly opinion leaders who influence others to adopt an innovation; they tend to have more years of formal education, they also participate socially outside their social group. In addition, they have access to various media and sources of information, where they obtain their knowledge about innovations. In general, early adopters have higher socioeconomic status than late adopters. In addition, early adopters tend to be less dogmatic and show greater rationality, have a favorable attitude towards change and science, and show an ability to cope with uncertainty and risk (Rogers, 2003)

Figure 9.Connnection between the Firm, IT and Business Capabilities:
Source: (Laudon& Laudon, 2012)

2.6.2 Organizational Context

The barriers that restrict the adoption of ICT in developing countries are many. For example, (Chacko and Harris, 2006) argue that in developing countries small and micro organizations are unprepared on many fronts, including finance and skills sets, so it would be a huge challenge to adopt ICT. There are three main obstacles: inadequate information, high adoption costs, and poor understanding of the dynamics of the knowledge economy. They further argue that in the Least Developed Countries (LDC), adoption is restricted by many factors, including being unaware of what the technology can do for these organizations. According to Moore's Law (1965), technology power doubles, and price halves every 18 months; consequently, the price of technology should be affordable to LDC. However, it is not. (Croes and Tesone, 2004) put it as follows: "the labor saving technology is more expensive than the wage it saves because of higher cost of capital."

The organization faces internal and external pressures when adopting innovation. The sources of internal factors are mainly the characteristics of the organization, including the

organization's mimetic characteristics, its past experience of technology, its strategy, and the most important factors are the organization's readiness, including available technological resources to adopt, and its size.

Organizational culture also has important role on ICT adoption. It reflects the firm's administrative approaches and dominant culture. It is impacted by the background and management approaches of the firm's founders. This expresses in the selection of ICT adoption: leader or follower and technology innovation: insourcing or outsourcing.

Organizations have a structure that is composed of different levels and specialties. Their structures reveal a clear-cut division of labor. Authority and responsibility in a business firm are organized as a hierarchy, or a pyramid structure. The upper levels of the hierarchy consist of managerial, professional, and technical employees, whereas the lower levels consist of operational personnel. In an organization, the adoption of an innovation is mainly determined by the management, but the characteristics of workers influence the adoption of an innovation. These characteristics, including their age, attitude, and motivation towards the innovation, their influence, ability, and freedom to initiate the idea of adopting an innovation at different levels of the organization, contribute to the adoption decision process (Lefebvre & Lefebvre 1996).

Place (location) also inhibits collaboration in large global or even national and regional firms. Assembling people for a physical meeting is made difficult by the physical dispersion of distributed firms (firms with more than one location), the cost of travel, and the time limitations of managers. Implementing information systems has consequences for task arrangements, structures, and people. According to the following model, to implement change, all four components must be changed simultaneously (Laudon& Laudon, 2012)

2.6.3 Environmental Context

The relationship between environmental sustainability and ICT is complex and is not well understood. This relationship can be viewed in two ways. The first is the ability of ICT to contribute to environmental sustainability through education, creating efficiency, and behavioral change (Tomlinson 2010). The second is ICT's negative effect on the environment by causing degradation. This degradation occurs as a result of energy consumption, resource depletion and e-waste (Rattle 2010). Furthermore, as the efficiency of ICTs increases, the total use of resources also increases (sometimes it is called Jevon's paradox) (Alcott 2005). This in turn results in more and more production of ICTs, this increase in turn requires more resources causing resource depletion and e-waste.

There is a wide range of government policies under environmental context that affect the efforts of organizations in any industry to accumulate ICT capabilities. As a result, they also influence the ICT adoption of the organization. These policies include trade policies (policies towards import of technologies), investment incentives, fiscal and monetary policies, tariff regulations, etc.

Government legislation can create a demand driven pressures of competition or even foreclose entry into industrial sectors with controls by licensing arrangements, raw materials and capital access. Government can facilitate ICT capability development of organizations through providing:

- Testing services to qualify products/services to meet local and international standards.
- Information centers to provide information related to ICT alternatives.
- Institutions for education, training and R&D.

The digital firm era requires a more dynamic view of the boundaries among industries, firms, customers, and suppliers, with competition occurring among industry sets in a business ecosystem. In the ecosystem model, multiple industries work together to deliver value to the customer. ICT plays an important role in enabling a dense network of interactions among the participating firms (Laudon& Laudon, 2012).

2.6.4 Technology Context

ICTs significantly change how organizations and individuals operate, by creating a network of connections, where applications enable access to the World Wide Web for information exchange, e-commerce, and creating gateways for national and international organizations to communicate with the wider world audience. This technological innovation enables small and micro business to have access to a bigger market compared to the traditional method of attracting local customers. Likewise, it provides the individual with a greater level of access, and freedom to access products and services, participate in the social media sphere, and this empowers individuals to become sources of information as well as consumers. One of the factors/barriers to the adoption of technology in lease developed countries is unreliable telecommunications infrastructure. (Karanasios and Burgess, 2008) show how SME owners use innovative methods to overcome inadequate and unreliable infrastructure by using a satellite link to connect to their customers.

ICT availability, today capabilities and future forecasting along with compatibility for addition are major technological factors affects ICT adoption of business organizations. Technologies that characterize one era may also be used in another time period for other purposes. The changes in IT infrastructure we have just described have resulted from developments in computer processing, memory chips, storage devices, telecommunications and networking hardware and software, and software design that have exponentially increased computing power while exponentially reducing costs (Laudon& Laudon, 2012).

2.7 Components of ICT

ICT infrastructure consists of a set of physical devices and software applications that are required to operate the entire enterprise. But ICT infrastructure, which evolved through time, is also a set of firm-wide services budgeted by management and comprising both human and technical capabilities.

The ICT infrastructures enable an organization to ensure that introducing changes into operations has the least impact possible to the business and its customers. The major components are presented as follow.

2.7.1 Internet platforms

Internet platforms is one of the major ICT component used by many users due to social media developments (Laudon& Laudon, 2012). It overlap with, and must relate to, the general networking infrastructure and hardware and software platforms (White& Bruton, 2009).

2.7.2 Networking platforms

Organizations needs servers, switches, router & many clients computer with a network interface card (NIC) in its networking/telecommunication platforms. A server computer is a computer on a network that performs important network functions for client computers, such as serving up web pages, storing data, and storing the network operating system (and hence controlling the network) (White& Bruton, 2009).

In order to connect personal computers and other digital devices at office level organizations has to use Local Area Network (LAN) with multiple layers of hubs organized into a hierarchy. Organizations need also Wide Area Network (WAN) to connect or integrate its branches with their head office. As organizations used to communicate with another network, such as the WAN and Internet it needs a router connected to web server. A router is a communications processor used to route packets of data through different networks, ensuring that the data sent gets to the correct address (Laudon& Laudon, 2012)

2.7.3 Device/hardware's platforms

In order to facilitate their work, organizations has to acquire desktop PCs, laptops, mobile apparatus and servers on device/hardware platforms with different processors, operating system, memory, and network connections (White& Bruton, 2009). The device/hardware platforms serving up web pages, storing data, and storing the network operating system (and hence controlling the network) (Laudon& Laudon, 2012)

2.7.4 Information systems/software platforms

Getting all the different kinds of systems in a company to work together has proven a major challenge. There are several solutions to this problem. One solution is to implement enterprise applications which comprise enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems (Laudon& Laudon, 2012). Firms uses enterprise systems, also known as enterprise resource planning (ERP) systems, to integrate business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system. Information that was previously fragmented in many different systems is stored in a single comprehensive data repository where it can be used by many different parts of the business (White& Bruton, 2009).

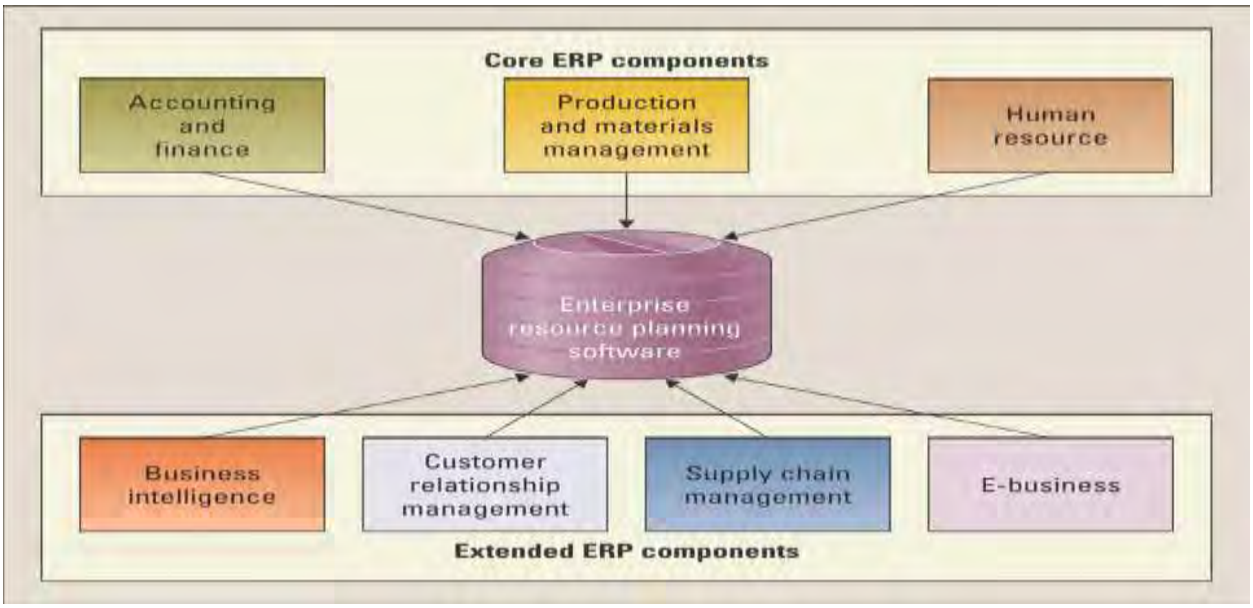


Figure 10.Components of an ERP System: Source: (White& Bruton, 2009)

In general, Knowledge management systems (KMS) enable organizations to better manage processes for capturing and applying knowledge and expertise. These systems collect all relevant knowledge and experience in the firm, and make it available wherever and whenever it is needed to improve business processes and management decisions. They also link the firm to external sources of knowledge (Laudon& Laudon, 2012)

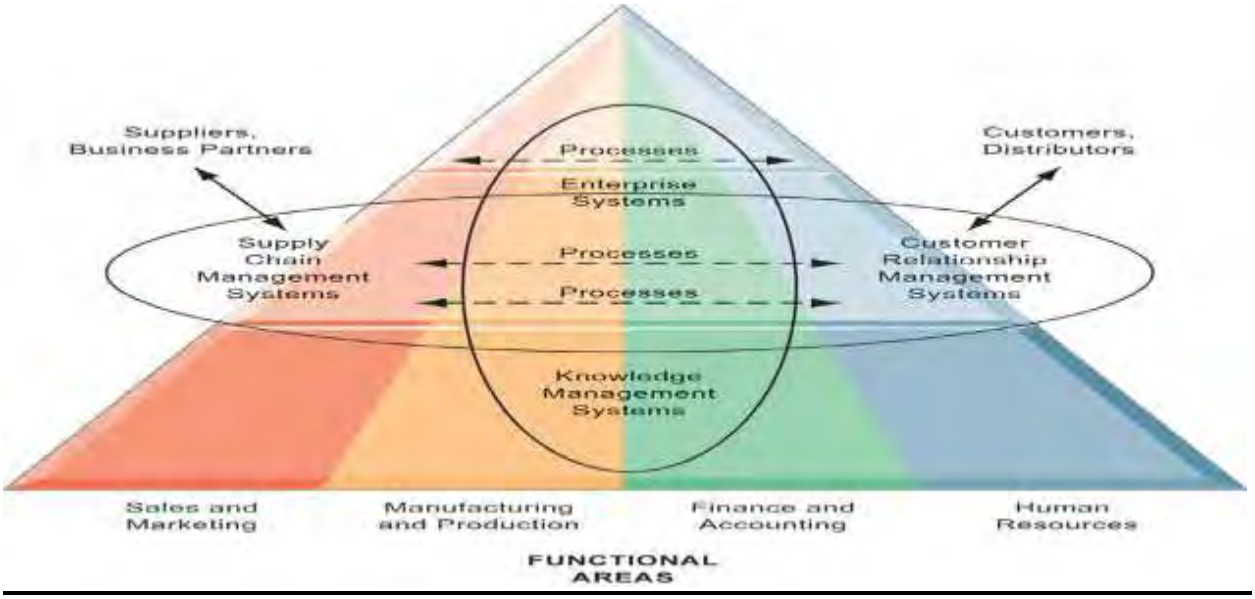


Figure 11.Enterprise Application Architecture: *Source: (Laudon& Laudon, 2012)*

2.7.5 Operating Systems

There are different operating systems useful to both back end and front end including the network that routes and manages communications on the network and coordinates network resources (White& Bruton, 2009). Linux, windows, chrome, android and multi-touch are the most known operating systems (Laudon& Laudon, 2012)

2.7.6 Database Managements System

The DBMS relieves the programmer or end user from the task of understanding where and how the data are actually stored by separating the logical and physical views of the data. The *logical view* presents data as they would be perceived by end users or business specialists; whereas the *physical view* shows how data are actually organized and structured on physical storage media (Laudon& Laudon, 2012). The database management software makes the physical database available for different logical views required by users (White& Bruton, 2009).

2.7.7 Consulting System and Integration Services

Today, even a large business organizations does not have the staff, the skills, or the necessary experience to deploy and maintain its entire IT infrastructure. This creates the consulting platforms of IT infrastructure.

Software integration means ensuring the new infrastructure works with the firm's older, so-called legacy systems and ensuring the new elements of the infrastructure work with one another (White& Bruton, 2009). Due to availability of variety of IT inputs and lack of global standard the need of integration between different systems is become essential.

In general there are seven major components that must be coordinated to provide the firm with a coherent IT infrastructure. All of ICT, along with the people required to run and manage them, represent resources that can be shared throughout the organization and constitute the firm's **ICT infrastructure**. The ICT infrastructure provides the foundation, or *platform*, on which the firm can build its specific information systems (Laudon& Laudon, 2012). Each organization must carefully design and manage its ICT infrastructure so that it has the set of ICT services it needs for the work it wants to accomplish with information systems. Listed here are major global technologies and suppliers for each component

Figure 12.The IT Infrastructure Ecosystem: *Source: (Laudon& Laudon, 2012)*

As technology is in a continuous progress there are also new recent developments emerged in the area of business. Some of the new practices or changes are listed as follow (Laudon& Laudon, 2012).

CHANGE	BUSINESS IMPACT
TECHNOLOGY	
Cloud computing platform emerges as a major business area of innovation	A flexible collection of computers on the Internet begins to perform tasks traditionally performed on corporate computers.
Growth in software as a service (SaaS)	Major business applications are now delivered online as an Internet service rather than as boxed software or custom systems.
A mobile digital platform emerges to compete with the PC as a business system	Apple opens its iPhone software to developers, and then opens an Applications Store on iTunes where business users can download hundreds of applications to support collaboration, location-based services, and communication with colleagues. Small portable lightweight, low-cost, net-centric subnotebook computers are a major segment of the laptop marketplace. The iPad is the first successful tablet-sized computing device with tools for both entertainment and business productivity.
MANAGEMENT	
Managers adopt online collaboration and social networking software to improve coordination, collaboration, and knowledge sharing	Google Apps, Google Sites, Microsoft's Windows SharePoint Services, and IBM's Lotus Connections are used by over 100 million business professionals worldwide to support blogs, project management, online meetings, personal profiles, social bookmarks, and online communities.
Business intelligence applications accelerate	More powerful data analytics and interactive dashboards provide real-time performance information to managers to enhance decision making.
Virtual meetings proliferate	Managers adopt telepresence video conferencing and Web conferencing technologies to reduce travel time, and cost, while improving collaboration and decision making.
ORGANIZATIONS	
Web 2.0 applications are widely adopted by firms	Web-based services enable employees to interact as online communities using blogs, wikis, e-mail, and instant messaging services. Facebook and MySpace create new opportunities for business to collaborate with customers and vendors.
Telework gains momentum in the workplace	The Internet, netbooks, iPads, iPhones, and BlackBerrys make it possible for growing numbers of people to work away from the traditional office; 55 percent of U.S. businesses have some form of remote work program.
Co-creation of business value	Sources of business value shift from products to solutions and experiences and from internal sources to networks of suppliers and collaboration with customers. Supply chains and product development are more global and collaborative than in the past; customers help firms define new products and services.

Figure 13.What is New in Management Information Technology?
Source: Source (Laudon& Laudon, 2012)

2.8 Empirical Review (Previous Studies)

In Ethiopia the need for ICT sector development is becoming imperative (Alemayehu, 2008). It is imperative to note that the country needs to explore new non-traditional export sectors along what economist call the “Kaldorian line” where the country does not have apparent comparative advantage as of yet. One such area where Ethiopia seems to have potential, but failed to exploit thus far, is the electronics sector in general and the software and ICT industry in particular. Under a public monopoly, the information and communication technology (ICT) sector in Ethiopia has seen substantial growth over the last five years (Lishan, 2012). Given the rise of domestic software firms, young skilled labor, and some excellent private sector software IT schools, sufficient attention and infusion of investment into this sector need to be made. There is the potential to turn it into a software exporting sector with global service delivery hubs that could exploit labor costs and time difference advantages compared to firms in developed countries.

Ethio telecom has invested lot expenditures for hardware, software, and management services to support an organizations’ web site, including web hosting services, routers, and cabling or wireless equipment (Balcha, 2015). A web hosting service maintains a large web server, or series of servers, and provides fee-paying subscribers with space to maintain their Web sites. According to CIT Standardization and Regulation Ministry of Communication and Information Technology, FDRE, the following achievements have been accomplished so far.

- As of June 2015, the country has achieved high subscription levels by raising the number of mobile subscribers to 40 Million, and Internet users to 10 Million.
- The TEP has resulted in Mobile service penetration of 44%, and Internet penetration has also reached 11%.
- The Country’s 85% of geographic area has coverage of mobile service. If only habitable areas are considered, this can be taken as 100% coverage.
- The mobile network coverage comprises 3G and 2G services, and 4G LTE technology deployment in the capital Addis Ababa.
- The government has also been working towards improving its international internet gateway capacity/bandwidth through international fiber optic links via neighboring countries Djibouti, Kenya and Sudan.
- The current international bandwidth capacity stands at 27.3 Gbps
- As a way of addressing the universal access challenges a strategy that was introduced and implemented is the Rural Connectivity Project (RCP).
- The Rural Connectivity Project was originally planned to create rural voice, Public Internet Access Centers (PIACs) and connect them using wireless local loop technology and VSAT.

- Each center was projected to have a PC, phone, fax and Internet access. Already 15,905 Kebeles have access to telecommunication services showing remarkable achievement of 97% in June 2015.

Besides the above accomplishment the government of Ethiopia planed the following in ICT by 2020 (Balcha, 2015).

Indicators	Units	2015	2016	2017	2018	2019	2020
Mobile Subscribers	'000s	40,000.0	52,732.4	65,464.6	78,197.2	90,929.6	103,662.0
Broadband Internet Subscribers	'000s	1,593.2	9,093.4	16,593.6	24,093.7	31,593.9	39,094.0
Narrowband Internet Subscribers	'000s	7,996.3	9,836.0	11,884.1	13,758.8	15,441.0	16,934.9
Fixed Line Subscribers	'000s	3,050.0	4,513.2	5,976.5	7,439.7	8,903.0	10,366.2
Mobile Subscribers per 100 inhabitants	%	43.9%	56.4%	68.2%	79.4%	90.0%	100.0%
Internet Subscribers per 100 inhabitants	%	10.5%	20.2%	29.7%	38.4%	46.6%	54.0%
Fixed Line Subscribers per 100 inhabitants	%	3.3%	4.6%	6.2%	7.6%	8.8%	10.0%

Figure 14.Ethiopian ICT Plan in 2020: Source (Balcha, 2012)

However inability to process and utilize market information, either due to lack of information or access to these information, as well as an inability to appropriately use it in a timely fashion if it is obtained has become another challenge for private sector development in Ethiopia (Alemayehu, 2008).

Various researchers have done different empirical studies on ICT adoption of Ethiopian large business organizations.

In SMEs context, there is very limited literature and research about ICT adoption regardless of many research works on Ethiopian large business organizations. The recent researches found on Ethiopian large business organizations are summarized as follow.

- Banking industry (Meseret, 2010), (Ayana, 2014), (Bisrat, 2015), (Yalew, 2015)
- Hotel Industry (Demeke, 2014)
- Transport industry (Sintayehu, 2014)
- Textile& Leather industry (kumlachew, 2015)

The first attempt in this regard is the work of (Meseret et al., 2010) which just discusses about the ICT for Ethiopian Banking Industry. These studies have discussed about factors affecting adoption of electronic banking system in Ethiopian banking industry, Factors affecting the adoption of Internet banking services by customers in Addis Ababa and The Impact of ICT on Ethiopian Private Banks' Performance respectively.

The major impediments to ICT adoption models stated above is the lack of tailored ICT models that could serve the Ethiopian banking industry with its current status of ICT usage, the country's ICT infrastructure level, the economic level of the customers, and subjective norm, job relevance, output quality, result demonstrability, experience, voluntariness, technology acceptance model, perceived ease of use, perceived usefulness, intention to use, usage behavior the enterprise and country level ICT policy. The models discussed can be used as a base for identification of different ICT drives and helped to the following ICT adoption model customization.
Generally, the model depicts the current drive of ICT adoption in the banks is the result of the factors related with organization and corporate strategies. Environmental factors, economic factors and management capacity are also present in with less intensity than the above two factors (Meseret, 2010).

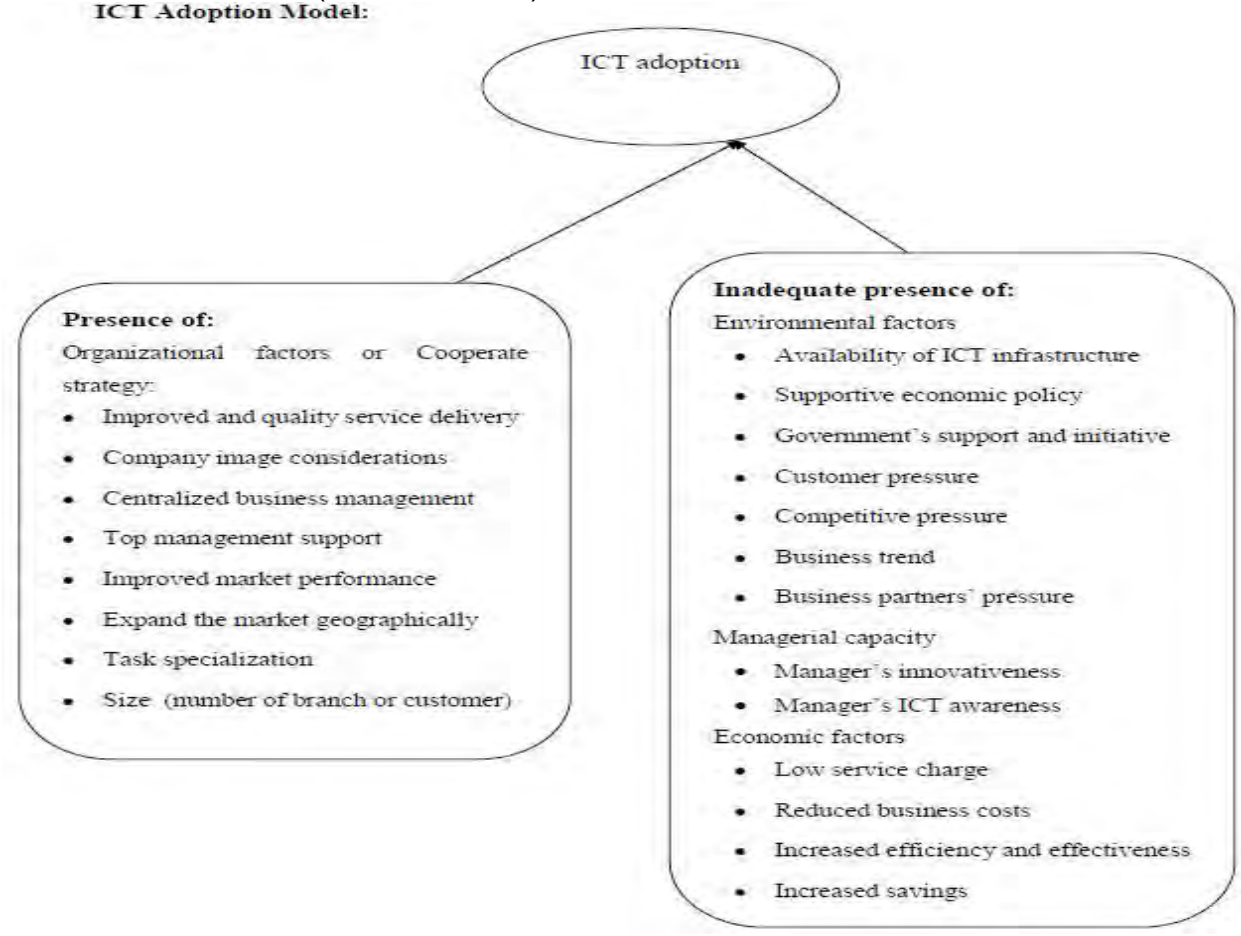


Figure 15.ICT Adoption Model for Ethiopian Banking Industry:
Source: (Meseret, 2010)

(Demeke, 2014) had identified the factors that facilitate the adoption and the barriers to ICTs' adoption in the hotel and tour operator business in Addis Ababa focused on development and poverty reduction through ICTs using Roger's diffusion of innovation model

Roger's diffusion of innovation model can be used to explain about why some people or organizations are in the front of accepting and adopting innovations and why others are lagging behind. The model gives a comprehensive framework by covering almost all important features that affect adoption of an innovation.

The limitation of this theory is noted by as early as 1971 especially its bias towards a pro-innovation stance, that the assumption of new innovations has positive outcomes and needs to be diffused and adopted by all members of social groups. Other notable limitations noted by Rogers and Shoemaker include individual-blame bias, recall problem, and issues of equality. Rogers diffusion of innovation theory is found to explain (at least partially) the adoption of ICT in the hotel and tour operator business in Addis Ababa, Ethiopia (Demeke, 2014).

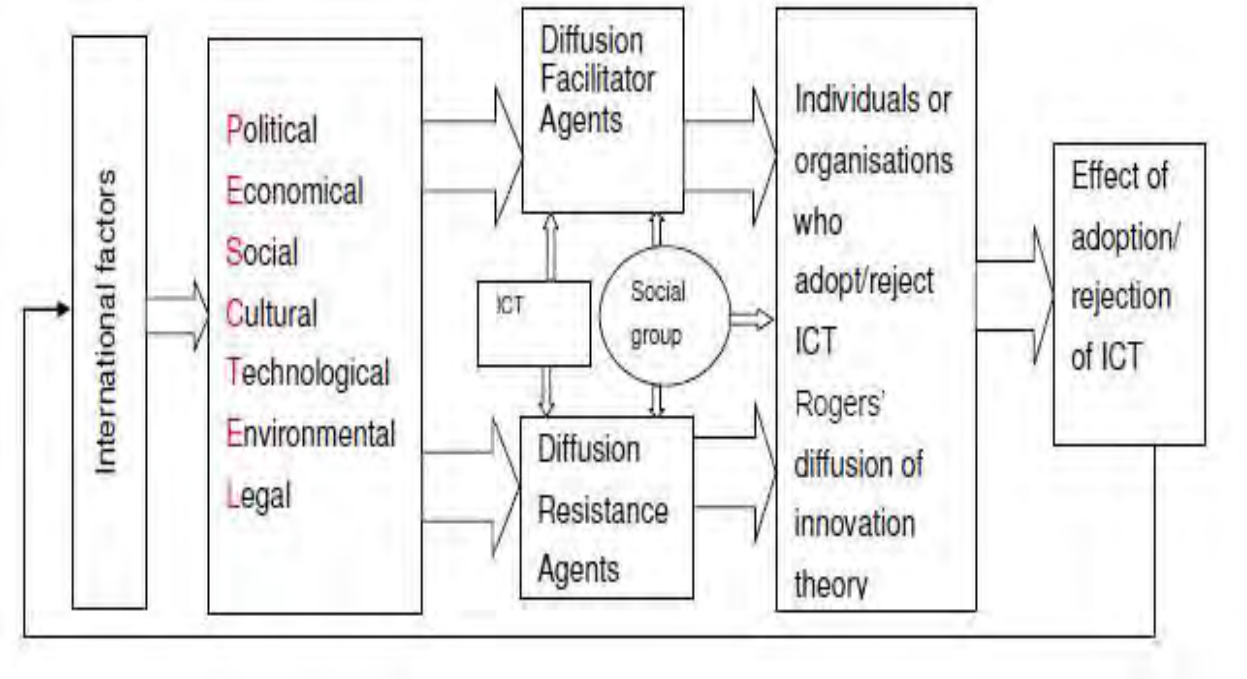


Figure 16.Diffusion Model for Ethiopian Hotel and Tour Operator:
Source: (Demeke, 2014)

(Kumlachew, 2015) also uncover the technology adoption of Ethiopian Manufacturing firms a case of textile and leather sector. Frist evaluated technological context describes both the internal and external technologies relevant to the firm. This includes current practices and equipment internal to the firm, as well as the set of available technologies external to the firm.

The researcher was interested in the adoption of a considerable number of new manufacturing technologies, the focus is limited to key organizational and environmental factors.

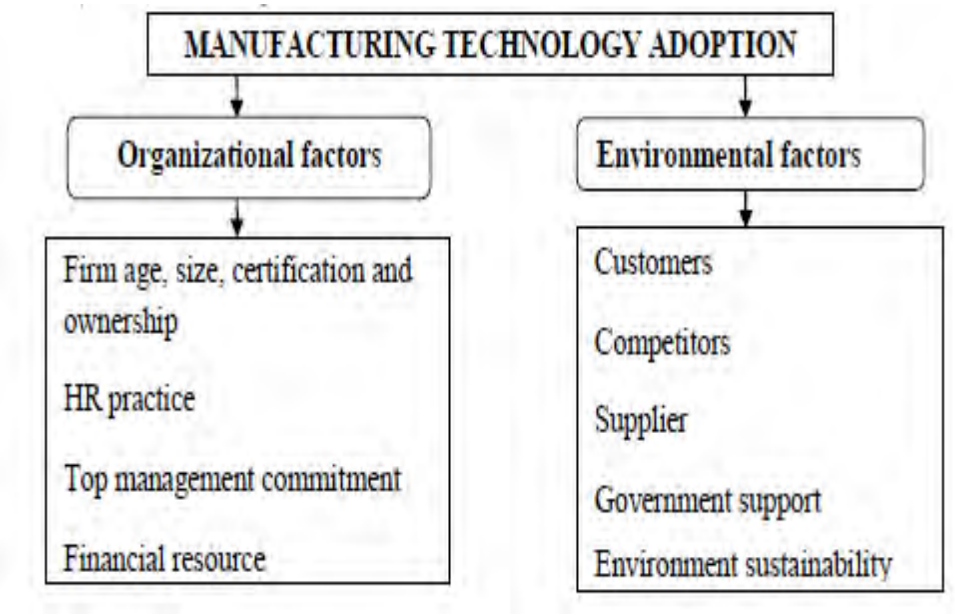


Figure 17.ICT Adoption Framework Proposed for Ethiopian Manufacturing:
Source: (Kumlachew, 2015)

The resultant framework categorized the determining factors in manufacturing technology adoption under organizational and environmental main dimensions are as shown in the figure above.

These researches (Meseret, et.al) identified most of the barriers and factors affecting ICT adoption measured the impacts of ICT and developed a model for their corresponding industry.

However setting clear classification between the detail factors and barriers of ICT adoption seems difficult.

The details of the barriers and factors discovered in the researches are presented and categorized as follow.

Therefore factors affecting ICT adoption rise themselves in the above literature and empirical review are categorized as follow.

- Business Strategies
- Economic factors
- Management& Employee
- Task issue and
- Environmental
- System Capabilities
- Proposed Influence

Table 2.1: Factors affecting ICT adoption (reason to acquire or use ICT)

SN	Factors Affecting ICT Adoption	Categories of Factors Affecting ICT Adoption	
		Sub Category	Major Category
1	Improved and quality service delivery	Business Strategies-Overall	Business Strategies-Overall
2	Expand the market geographically		
3	Improved market performance		
4	Company image considerations		
5	Size (number of sales outlet or customer)	Economic Factors	Organizational Factors
6	Reduced business costs		
7	Manager's innovativeness	Management& Employee	
8	Owners/Manager's ICT awareness		
9	Top management/owner support on ICT		
10	Centralized business management	Task Issue	
11	Task specialization		
12	Increased efficiency and effectiveness		
13	Government's regulation and law	Environmental Factors	Environmental Factors
14	Government's support and initiative		
15	Availability of ICT infrastructure		
16	Customer pressure		
17	Supplier Collaboration		
18	Business partners' pressure		
19	Competitive pressure		
20	Ease of use	System Capabilities	Technological Factors
21	Quality of IS systems and capabilities		
22	Compatibility		
23	Security		
24	Autonomy	Proposed Influence	
25	Speed up business processes		
26	Extend beyond normal business hours		
27	Launch new services		
28	Link internal and external business processes		

The barriers to adopt ICT that colleted from the literture and emperical review are also gropued into the following categories.

- Business Strategies-ICT
- Customer Pressure
- Government
- Supplier Pressure
- Economic Factors
- Management& Employee

- Affordability/Cost of ICT
- Easiness to Use

Table 2.2: Barriers to adopt ICT (reason not to acquire or use ICT)

SN	Barriers of ICT adoption	Categories of the Barriers to adopt ICT	
		Sub Categories	Major Categories
1	Inadequate ICT strategy	Business Strategies-ICT	Business Strategies-ICT
2	Inability of employees to use ICT		
3	ICT expenditures are limited		
4	Customers are not prepared to use ICT	Customer Pressure	Environmental Barriers
5	Taxes are too high on hardware and software	Government	
6	Unreliable legal ground for ICT investment		
7	Lack of security and privacy on the Internet		
8	Lack of ICT infrastructure		
9	Lack of government incentive		
10	It is difficult to find reliable ICT suppliers	Supplier Pressure	
11	The supply of ICT is not matching the ICT needs of the unit		
12	The size of the unit is not feasible for ICT investment	Economic Factors	Organizational Barriers
13	Lack of perceived economic or other benefits to the unit	Management& Employee	
14	Reluctance of personnel to use ICT		
15	Expensive hardware/software	Affordability/Cost of ICT	Technological Barriers
16	New versions of existing software introduced too often (support fee)		
17	Difficult to recruit qualified ICT personnel		
18	Qualified personnel are expensive		
19	Fear of technology	Easiness to Use	
20	ICTs are too complicated		
21	Lack of localization- Amharic user interface		
22	Lack of training& consulting		

Flexibility/adaptability of product, reduction of operational cost, efficiency of business processes, quality of customer service, productivity of employees, motivation of staff, staff development, growth of revenue, competitive advantage, ease of structuring and restructuring are ICT influence defined in the above researches .

However, these are just about large organization which are found to be characterized by stabilized finance and an ICT infrastructure with good coverage and services. The factors,

barriers and influence of ICT along with the model may not be compatible for SMEs with limited finance and ICT infrastructure. The researchers also rather suggested to further study to address the contextual issues in any different other organizations.

Therefore, this research will try to make detail study on ICT of UPAREZ Business PLC based on four dimension of ICT adoption business strategies, organizational factors, technological factors and environmental factors and develop a custom made model for the company. .

2.9 Conceptual Framework for ICT Adoption

Based on the various approaches presented above in the literature review a modified conceptual framework on ICT adoption towards the competitiveness of business organizations are to be developed.

(Fisher, 2007) in some conceptual frameworks the concepts are related because they are stages in a process. These relationships are also often illustrated by 'boxes and arrows' diagrams. However, in these cases the relationships are not based on cause and effect but on logic and proper order.

As per (Fisher, 2007) there are many mechanisms used for building model based on logic or proper order. Some of these are stages in a process, hierarchical relationships, maps and coordinates, pairs of opposites, exchange and equilibrium, similarity and things to watch out for.

The idea of equilibrium, which is present in force field analysis, leads to other forms of relationships. Concepts may be related through a mechanism of exchange that leads to a balance or equilibrium between them. And its exchange relationship is a common one in business and management (Fisher, 2007).

Sustainable growth (SG), competitiveness, ICT, economic factors (asset- finance), management-employee, product/service, supplier, customers, competitors, price/quantity, business strategies (planning, organizing, directing and controlling) and government, are the major constructs summarized to be first level conceptual framework in the way to reflect the parties different economic interests.

However, the issues or the constructs are highly interrelated each other and difficult to put clear demarcation among them.

Therefore the framework are to be presented in the way relationship of the organization business strategies along with its management, the ICT, the environment and the ultimate competitiveness-sustainable growth are interlinked one each other and demonstrated the research assumption of business organizations are responsible for societal values and environmental viability.

Definitions of Concepts

ICT-is a means to data, information and knowledge and is data, information and knowledge. In today's technological advancement the means and the ends are very close and interrelated each other.

Economic factors (asset-finance) are basic sources of supply with scarcity need to be used in optimized way subject to decomposition (depreciation) cycle of each elements of asset-capital. Understanding the useful time of resources and accumulating reserve based on their decomposition cycle needs quality data, information and knowledge (ICT).

Management-employee are basic sources of organizational interest need to be prioritized based on hierarchy of needs of individuals, groups, and organization at large. Prioritizing needs of product/services and leading individuals, groups, and organization towards a common goal also consumes a lot of quality data, information and knowledge (ICT).

Economic factors (asset-finance) and management-employee are the basic inputs of organization which are exchanged in demand of customers and supply of product/services. In order to use in optimized way, matching the demand of customers with supply capacity and strategic prioritization, also needs much amount of quality data, information and knowledge (ICT)

Price is a constant measurements of customer satisfaction and supply until the satisfaction of the customers equals the supply of products/service in quantity and quality. Other indicators of sustainable growth such as societal and environmental responsibilities and values need to be considered in one way or other dimensions. Proper pricing strategy towards the equilibrium and customer loyalty needs numerous data, information and knowledge (ICT)

Planning, organizing, directing and controlling all the above factors in way to bring competitiveness-resulted sustainable growth is very important. The business strategies to plan, organize, direct and control the input and output (competitiveness-sustainable growth), depends on the data, information and knowledge (ICT) acquired/adopted of about the need of the customers and supply capacity.

The amount and quality of data, information and knowledge acquired/adopted depends the overall capability of the information and communication technology (ICT) and the analytics of the Management-Employee. The analytics of Management-Employee also changed over with frequent interaction of quality data, information and knowledge (ICT).

Competitiveness-sustainable growth in static economics (time-short run and resources are scared-including ecological environment) subjected to all the

- Product/service-Supplier
- Customer-Competitors
- Measurement-(Price-Quantity-Quality)

- Input-output cycle (process) –(Asset-Finance and Management-Employee),
- Environment- (Government, Competitive Pressure)
- Leadership (Management-Employee).

All of the above and government also are related with the quality data, information and knowledge (ICT) in one way or other.

Dynamic economics (long run and unlimited resource) may impact the conceptual framework in a different way and that is not in the scope of this research.

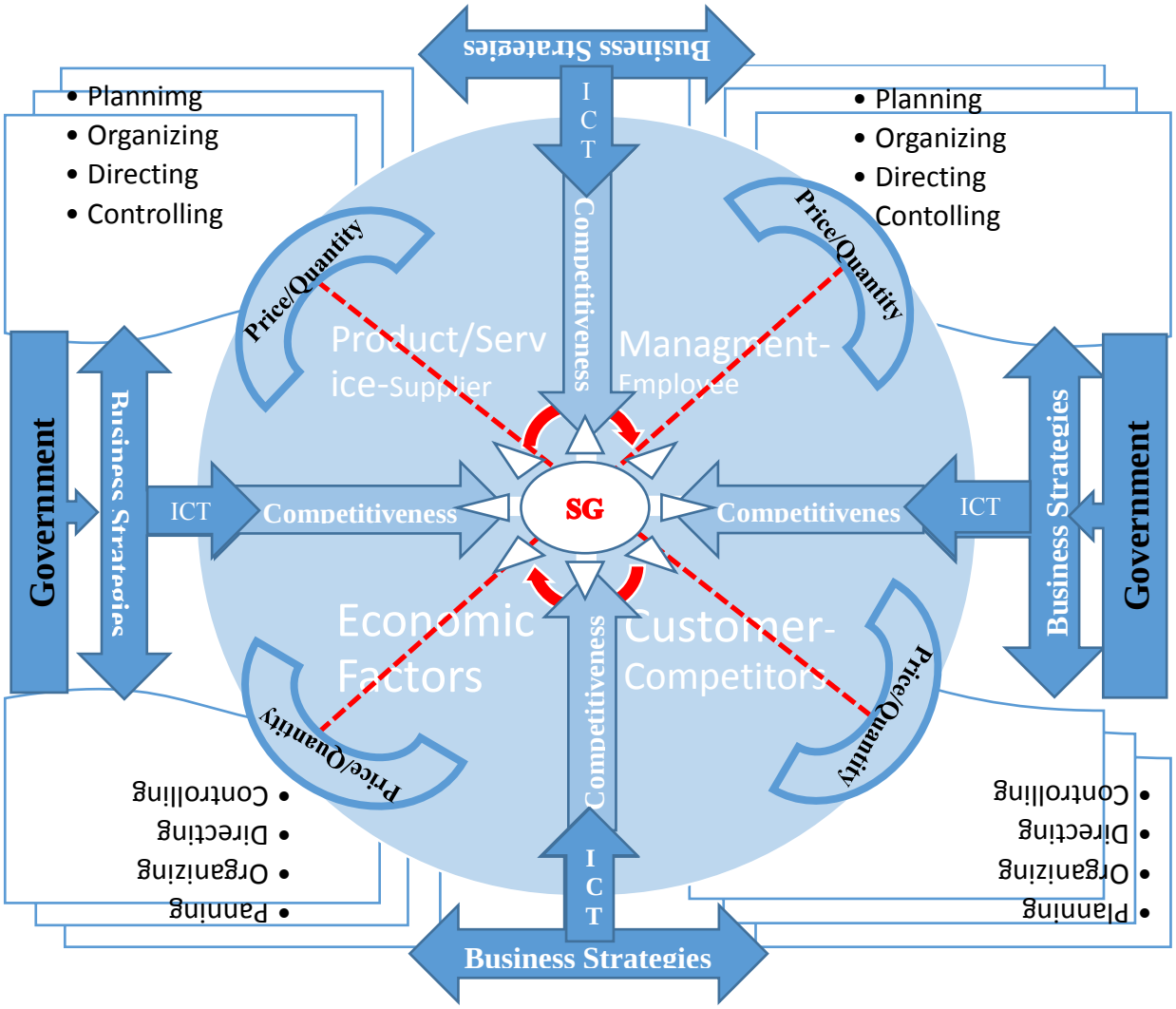


Figure 18.First Level Conceptual Framework for ICT Adoption

*The reason for some of the text presented in a reversed text position is to refer the same issues affects various factors from different perspectives.

3. Research Philosophy and Methodology

3.1 Type of the Study

3.1.1 From knowledge philosophy point of view

This research assumes that the current modern organizations and their business could be best described by post-positivist (constructivists) view of objectivity-that is objectivity cannot be a characteristics of a single individual (scientist) in his confine who is responsible for putting aside his/her biases and beliefs and seeing the world as it 'really' is (AAU, 2009). The research believes there is no a probability to be an absolute value-free. Therefore, it perceived objectivity as a value-bounded social phenomenon that can be reformed for best achievement through triangulation of multiple fallible perspectives. The influence/assumptions of societal and environmental responsibilities and values of business organizations are inherent to the inquiry will be revealed in the research.

3.1.2 From methodological philosophy point of view

There are two kinds of research based on philosophy of methodology used (AAU, 2009). Qualitative and quantitative methodology. As this research assumes post-positivist (constructivists) view of objectivity, it doesn't want to analysis and present its result in a form of statistical summary or analysis- it is not a quantitative study. Therefore this research doesn't answer questions like how often each factor affects ICT adoption and related to competitiveness

Thus, this research will be qualitative in its methodology or approach and descriptive in its presentation.

3.2 Sampling Design

The study populations include the whole staff of UPAREZ that were involved in decision making the ICTs specifically ICT adoption.

This research used a non-probability purposive sampling technique, because it provide the researcher more freedom in terms of the number of issues that could be investigated. This sampling techniques are common when researchers prefer not to generalize, but to understand the topic in-depth (Bhattacherjee, 2012). Thus, the sample selection method was designed to insure a diversified decision makers of ICT is included in the research process.

Thus a total of 32 different SBUs and department ICT staffs, heads and managers were surveyed, which was 21% percent of the total population 154 staffs who are employed in

UPAREZ. The questionnaires were distributed purposefully to different SBUs and departments in order to use the data for descriptive case analysis.

Table 3.1: Sampling Design

Description	No of staffs						
	SBUs						
		Trading					
	CON	Pharmacy	Supermarket	Timber	TRNS	HO	Total
Population	48	16	26	18	32	14	**154**
Population %	**17%**	**9%**	**14%**	**20%**	**31%**	**9%**	**100%**
Sample Selected							
ICT Officer	1	1	1	1	1	3	**8**
Department Head	4	2	3	2	2	-	**13**
SBUs Manager	1	1	1	1	1	-	**5**
Department Manager	-	-	-	-	-	6	**6**
Total Sample	**6**	**4**	**5**	**4**	**4**	**9**	**32**
Sample %	**13%**	**25%**	**19%**	**22%**	**13%**	**64%**	**21%**

3.3 Sources of Data, Information and Knowledge

Primary and secondary source of data were used to collect the necessary and appropriate hard and soft data, information and knowledge. Internet as a major element of ICT platform contributes a lot to this research.

3.4 Procedures& Methods of Data Collection

To collect data case observation, in-depth interview and survey questioner were used as procedure and methods of data collection.

1. A SBUs case observation were conducted to
    1. Identify ICTs adopted on SBU and departments UPAREZ.
    2. Compare similarities and differences on adopting ICTs
2. In-depth face to face interview with concerned SBU and department managers were done based on the following major discussion area (research questions).
    1. What are the ICTs adopted in UPAREZ SBUs and departments?
    2. What are the major barriers of ICT adoption in UPAREZ?
    3. What are the most important factors affecting ICT adoption in UPAREZ?
    4. How ICT influence UPAREZ towards its competitiveness?
    5. What should be the model to adopt ICT in UPAREZ?

3. Survey questionnaire were used in the following issues identified in the interview.
    1. To list components of ICT in UPAREZ for listing
    2. To list barriers of ICT adoption in UPAREZ for listing
    3. To rank important factors affecting ICT adoption.
    4. To identify the perception on ICT influence towards competitiveness.

3.5 Data Analysis Method

Descriptive method of analysis provides statistics that are used to describe the basic features of the data in a study. This facilitates to describe the demographic characteristics of the respondents and the firm; the role of ICT; as well as the major barriers and most important factors for ICT adoption using frequency, percentage, average, tabulation and graphs. The limitation with this analysis is that descriptive statistics do not show the relationship among the variables and the influence that each variable may have on the response. Descriptive analysis does, however often provide guidance for more advanced quantitative analyses (Kothari, 2005).

3.6 Validity and Reliability

In using the above sources of data and instruments, some procedures were made to make sure the reliability of materials and the validity of the outcomes.

By using two methods of data collection (interview and survey questioner) data triangulation were done consequently to insure the reliability.

Analysis triangulation on findings from some other sources, which deals about ICT adoption in Ethiopia, were done accordingly for the sake of validity and reliability.

3.7 Methodological Framework

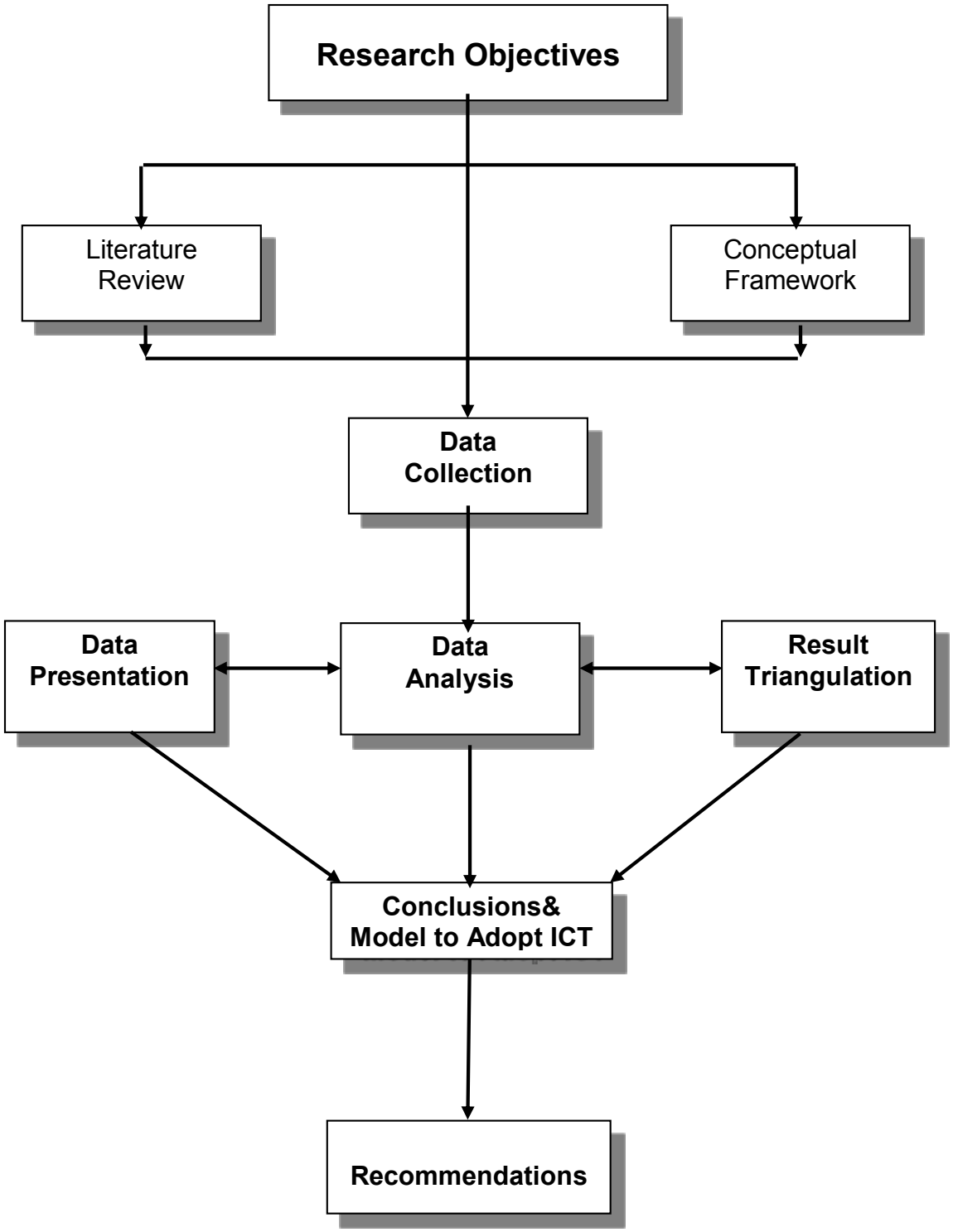


Figure 19.Methodology of the Study

4. Presentation, Analysis and Interpretation of Findings

In data analysis, the collected data need to be analyzed in a manner where interpretations could be done and information could be retrieved from it. This was where the objectives of the research come to be resolved and achieved. In this part of the data analysis, reports about ICT adoption of UPAREZ was illustrated using verbal descriptions supported with graphical presentations. The report included SBUs' background in terms of their financial position and Contribution to UPAREZ, ICTs components, barriers of ICT adoption, factors affecting ICT and influence of ICT adoption of UPAREZ .The many available features of Microsoft Excel was used for the analysis purpose.

4.1 Respondents' Background

The respondents of the research were professionals, heads and mangers with diversified role and responsibility in SBUs and departments of UPAREZ. All of the respondents had given their response accordingly.

Table 4.1: Respondents Summary

SN	Type of Respondents	No of Respondents						
		SBUs						
			Trading					
		CON	Pharmacy	Supermarket	Timber	TRNS	HO	Total
1	ICT Officer	1	1	1	1	1	3	**8**
2	Department Head	4	2	3	2	2	-	**13**
3	SBUs Manager	1	1	1	1	1	-	**5**
4	Department Manager	-	-	-	-	-	6	**6**
	Total	**6**	**4**	**5**	**4**	**4**	**9**	**32**

4.2 Company Profile

4.2.1 Background

UPAREZ established on March 2011, was initially engaged retailing pharmaceuticals. Besides it was trading of other fast moving consumable goods (super market items). By January 2012, company went on importing timber and related items, and giving vehicle rental service. By the year 2013, the demand of vehicle rental service was high day by day. Realizing that was the opportunity and there was enough capability, company carried out purchase of trucks and recruiting staff to give transport service.

In January 2014, company went on doing construction focusing on building finishing works and landscaping.

Now, UPAREZ is engaged in construction (finishing and landscaping works), trading (pharmacy, supermarket items and timber) and transport service. It has also a plan to invest in ICT in Ethiopian ICT village (park) and gem stone export.

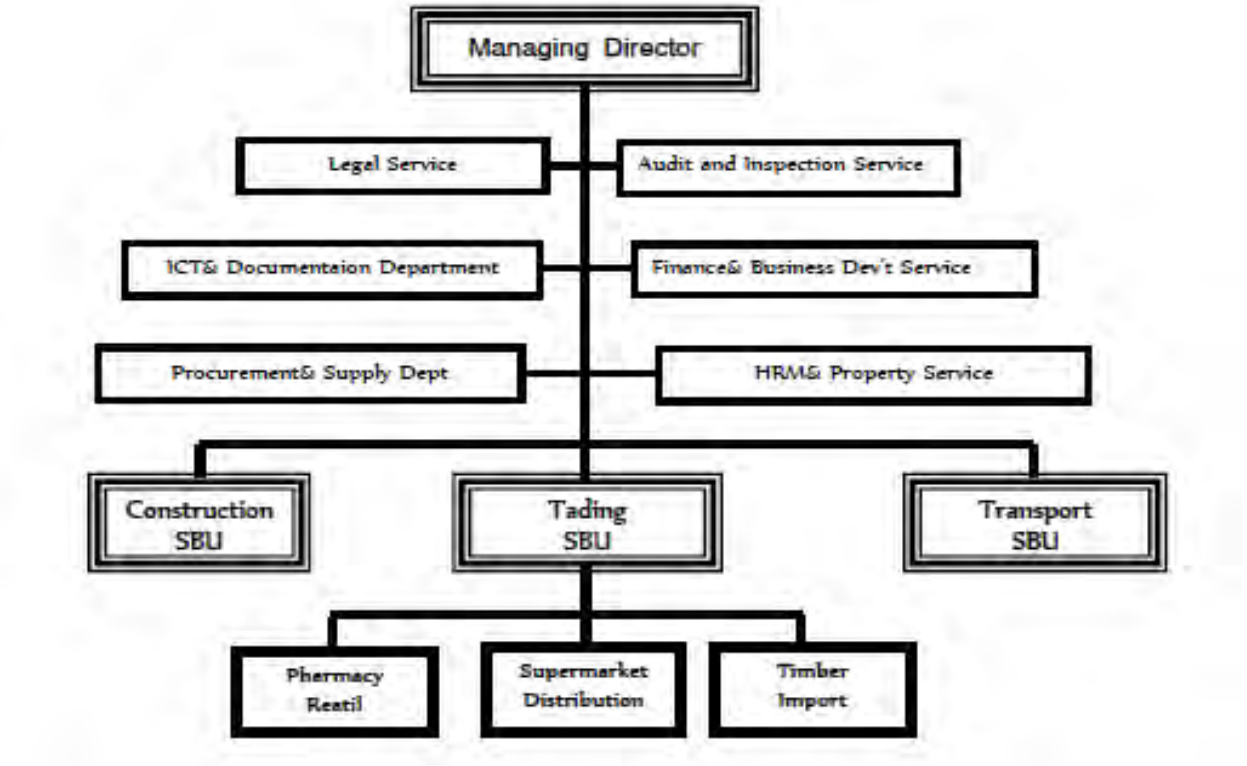


Figure 20.Organizational Structure of UPAREZ

UPAREZ as SME, currently has a capital of 17.5 million and an employee of more than 154 along different products/services with unknown market share.

Table 4.2: UPAREZ Resource Position and Performance

SN	SBUs	At the End of July 07, 2015					
		Capital*	%	No of Staff	%	Revenue*	%
A	Trading						
1	Pharmacy	1,500,000	9%	16	10%	3,150,000.00	10%
2	Supermarket Item DST	2,500,000	14%	26	17%	6,250,000.00	20%
3	Timber Import	3,500,000	20%	18	12%	7,875,000.00	25%
B	Construction	3,000,000	17%	48	31%	8,000,000.00	25%
C	Transport Service	5,500,000	31%	32	21%	6,250,000.00	20%
D	Head Office	1,500,000	9%	14	9%	-	0%
	Total	**17,500,000**	**100%**	**154**	**100%**	**31,525,000.00**	**100%**

* For the sake of simplicity figures were rounded to the next thousand amount.

4.2.2 Potential Competitiveness

UPAREZ in its company profile stated that the following are to be its elements of sustainable competitiveness.

Corporate Social Responsibility

UPAREZ strive to assume corporate responsibilities in every aspect of our work. It do so based on broad understanding of duties as a business company, member of society and employer, and defines that compliance means conducting sound and fair business activities that are in line with corporate rules and social norms as well as complying with laws and regulations.

Safety, Insurances& Risk Management System

UPAREZ fundamental policy is to create an environment in which every employee can fully exercise his/her abilities to produce results, by treating all employees fairly on the basis of respecting any diversity and human rights.

Competitive Skills& Training Strategies

In order to cop the dynamic environment of the business, UPAREZ has designed intensive and extensive staff training programs with different packages. It also has an arrangement to involve apprentices with different University in Public Private Partnership (PPP). These enable UPAREZ to perform in a tight skills market and to provide quality goods/services as the market heats up.

Facility, Technology Used& Specialized Capabilities

UPAREZ have enough basic resources in order to be competitive in today's market and is implemented integrated ERP software in all aspects of the company to facilitate the resources, work process and maintain proficiency.

Delivery Performance and Reliability

UPAREZ have already done several tasks in various SBU across different sector. The management (in different type of business) have been proven efficient and reliable in its clients.

Continuous Improvement and Innovation

UPAREZ put major emphasis on continuous improvement and innovation. Its Business Development Department is provided competent manpower and enough budget to 'going the extra mile' and come up with innovative products and services into the marketplace.

New Idea Award (NIA), which is organized and operated by the company, is one of the interesting competitions between staffs and members.

The main responsibility of UPAREZ management is to be competitive and sustainable in the market for in definite period of time through effective leadership and entrepreneurship.

Different managements of UPAREZ tried to prepare various types of plans during their stay. The strategies assumed, implementation and attainment of the plan are always in argument by all the concerned internal and external parties depending on their interest.

Having this row across members on strategies, implementation and achievement; leading the company to edge of competitiveness seems have some level of consensus. To speed up the growth and increase the competitiveness, the company has clearly stated in its profile the contribution of ICT need to be very high.

Circulation of data, information and knowledge through ICT and influences among owners do not necessary depends on the members' willingness to come to continuous face to face dialogue. As result of the influences of the ICT, the members has the probability to adjust their attitude and increase contributions and tune the policies and strategies

4.3 General Review of ICT Department

The company has ICT department at head office level and ICT officers at each SBU. The head office ICT department is responsible for the following major duties and responsibilities.

1. Provide list of ICT works
2. Make available necessary inputs for ICT
3. Organize project team for ICT assignment
4. Provide training on ICT framework and platforms, and ensure proper usage
5. Keep all necessary ICT documents and provide on request.
6. Getting verification and confirmation for deliverables from user unit
7. Attend discussions that prepared for ICT idea exchange and progress evaluation
8. Giving approval for tested ICT works
9. Initiate payment for ICT works.

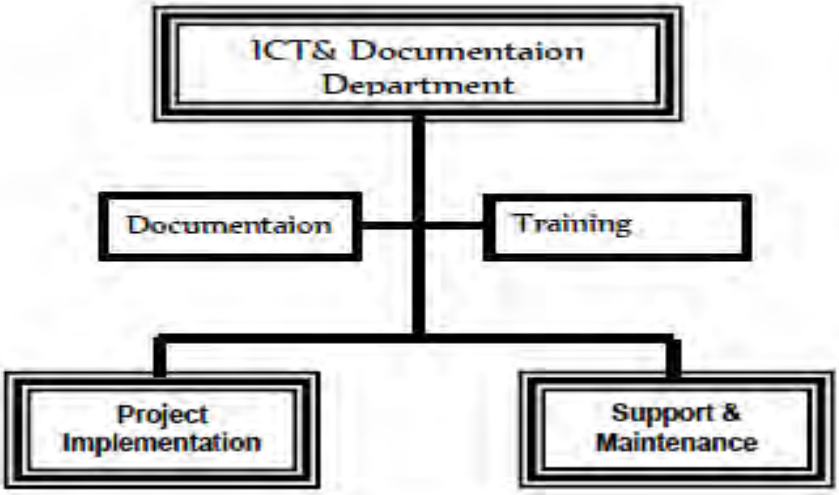


Figure 21.Organizational Structure of UPAREZ ICT Department

4.4 ICT Components of UPAREZ

The role of ICT ranges from changing individual lives to controlling the pace and path of the world economy. One of the reasons for this liberated coverage is the availability of ICT for almost every business and social activity. ICT components can be produced to serve a general purpose that cross SBUs and departmental activities of UPAREZ. On the other hand customized ICTs and its' services are what really make ICT the essence of every SBUs and departments of UPAREZ. UPAREZ ICT components collected from survey and interview are presented as follow on each sub component.

4.4.1 Computer hardware platforms

In order to facilitate its work UPAREZ has acquired

- Forty five desktop PCs,
- Six laptops computers
- Ten smart phone and
- Two server on computer hardware platforms.

The desktops and the laptops are using Intel microprocessors with a network interface card. The servers, stored in racks, are HP blade servers that are consisting of a circuit board with Intel processors, memory, and network connections.

The server computers are computers on a network that performs important network functions for client computers, such as serving up Web pages, storing data, and storing the network operating system (and hence controlling the network).

4.4.2 Operating system platforms

UPAREZ has mostly used Windows-based operating systems Windows XP, windows7 for its client PCs and server to manage the resources and activities of the computer. And Microsoft Windows Server is a network operating system implemented for the servers. UPAREZ has also started to use a mobile application with android operating system for Trading SBU for supermarket items distribution in collaboration with its supplier.

4.4.3 Enterprise software applications

Firm's uses enterprise systems, also known as enterprise resource planning (ERP) systems, to integrate business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system. UPAREZ implemented enterprise applications which comprise enterprise systems, supply chain management systems and customer relationship management systems.

Table 4.3: Distribution of Enterprise Software Applications

SN	Available Enterprise Systems	Description	Implemented System			HO
			CON	TRD	TRANS	
1	POS	Point of Sale	Yes	Yes	Yes	Yes
2	INV	Inventory Mgt System	Yes	Yes	-	Yes
3	PRDN	Production Mgt Sytem	Yes	-	-	Yes
4	HRM	HRM Mgt System	-	-	-	Yes
5	PMS	Property Mgt System	-	-	-	Yes
6	FleetMS	Fleet Mgt System	-	-	Yes	-
7	ACCT-CNET	Accounting Mgt System	-	-	-	Yes
8	ACCT-Peachtree	Accounting Mgt System	-	-	-	Yes
9	Peach Sync	System Interfacing	-	-	-	Yes
10	Doc Sync	Document Sharing	Yes	Yes	Yes	Yes
11	CRM	Customer Relation Mgt	-	-	-	-
12	SCM	Supply Chain Mgt	-	Yes	-	-
13	Web Site	Web site	-	-	-	-

POS and Doc Syn were systems used across all parts of the company. These systems are basically related with sales in which the government has a great concern to control the tax need to be collected (FDRE-ERCA, 2008).

The above table depicts that the company is using two accounting system (CNET and Peachtree) simultaneously. This is due the reason CNET system didn't became capable of handling the company's' expectation. As result the company decided to use the free pirated software-Peachtree along with its interfacing software developed by the same suppler CNET Software Technology PLC. Peachtree interface is a software designed to integrate the Point of Sales (POS) with Peachtree Accounting software in turn avoids tedious document posting in accounting department. Most of the accounting record keeping has been done by store keepers and sale persons of the company.

The supply management system (SCM) was sponsored by tone of supplier of super market items (Uniliver). From the given list, CRM and Web site were not implemented at all in any of UPAREZ SBUs and departments.

4.4.4 Data management and storage

The database management software makes the physical database available for different logical views required by users of SBUs. The main DBMS of UPAREZ is located in each SBUs and HO. Each SBUs access HO through the network and internet platforms.

UPAREZ has dedicated servers for specific services, such as

- Storing and managing files and databases (file servers or database servers),
- Storing and managing e-mail (mail servers), or

4.4.5 Networking platforms

UPAREZ have two servers, two switches, a router & many clients with a network interface card (NIC) in its networking/telecommunication platforms. A server computer is a computer on a network that performs important network functions for client computers, such as serving up storing data, and storing the network operating system (and hence controlling the network).

The network operating system (NOS) that routes and manages communications on the network and coordinates network resources is Microsoft Windows Server. UPAREZ network also contain a switch acting as a connection point between the computers. Switch has more intelligent than a hub and can filter and forward data to a specified destination on the network.

In order to connect personal computers and other digital devices at head office level UPAREZ has used Local Area Network (LAN) with multiple layers of hubs organized into a hierarchy. The network is designed based on star network topology; some devices on the network connect to one hub. The network traffic from the devices flows through the switch and extended to another switch connected together in star network.

UPAREZ uses the dominant LAN standard or protocol called Ethernet. It specifies the physical medium to carry signals between computers, access control rules, and a standardized set of bits used to carry data over the system. It has data transfer rates of 200 Mbps.

UPAREZ has also Wide Area Network (WAN) to connect or integrate its branches with head office. As the company used to communicate with another network, such as the WAN and Internet it has a router connected to Document server. A router is a communications processor used to route packets of data through different networks, ensuring that the data sent gets to the correct address.

4.4.6 Internet platforms

UPAREZ is using internet synchronization and asked public IP address for its remote communication with its out lets. The telecommunications platforms are based the transmission control protocol (TCP) or internet protocol (IP) protocol suite as a standard. They are provided by Ethio telecom which is the only Internet service provider (ISP) in the country (FDRE-MCIT, 2009). The broad band internet connection is digital subscriber line (DSL) which has 6Gbs data transfer rates. The public IP address requested has three usable slices used for remote support.

4.4.7 Consulting system integration services

Today, even a large firm does not have the staff, the skills, the budget, or the necessary experience to deploy and maintain the entire ICT infrastructure by themselves. UPAREZ has also outsourced its

- Enterprise software applications to CNET Software Technology PLC
- Network platform to Omicron Engineering PLC which is Cisco certified.
- Document synchronization platform of its SBUs-Head Office to drop box which is third party free software used to communicate data& file through internet.

Software integration is ensuring the new infrastructure works with the firm's older, so-called legacy systems and ensuring the new elements of the infrastructure work with one another. In accounting UPAREZ has been used CNET-Interfacing software to ensure the integration with the free pirated legacy system-Peachtree software.

Table 4.4: Implemented ICTs Summary

SN	ICT Issues	Telecom Service	Device/Hardware's			Information System (Software)												
			Server	Computer	Mobile	POS	INV	PRDN	HRM	PMS	Fleet	ACT	Peach tree	Peach Sync	Doc Sync	CRM	SCM	web Site
1	Availability of ICT																	
	• Owned	6GB	2	51	10	4	3	2	1	1	1	1	1	1	4	0	1	0
2	Affordability/Cost of ICT																	
	• UOM	MB	PCS	PCS	PCS	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr	Birr
	• Cost	0.35	108,000	12,000	1500	5,967	18,965	32,758	8,844	18,797	14,567	34,067	-	5,931	5,931	8,985	Supplier	30,000
Total Investment		2,100	216,000	351,900	15,000	23,868	56,895	65,516	8,844	18,797	14,567	34,067	-	5,931	23,724	0	-	0
3	Easiness to Use ICT																	
	• Training& Consulting	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	NO
	• Localization –Amharic	NO	NO	NO	No	NO	NO	NO	NO	No	No	NO	NO	NO	NO	NO	NO	NO
4	Capabilities/Quality ICT																	
	• Speed	100MB	???	2.5 GZ	1.1GZ	-	-	-	-	-	-	-	-	-	-	-	-	-
	• Security	Secured	Yes-QHT	Yes-QHT	Yes-Avast	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial	Audit Trial
	• Operating System/Organ	Ethio Telecom	Windows Server	Window	Android	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window

Majority of the above ICTs were acquired due to the company's centralized management strategy, top management/owner support on ICT, government law and supplier collaboration. However, the use (utilization) of the ICT limited by the way of system orientation and employee perception. Some SBUs directly assigned staffs to operate the systems, while others sent their staff for training first in order to avoid reluctance of personnel to use ICT.

4.5 Barriers of ICT adoption (reason not to adopt) in UPAREZ.

Barriers that could be limiting the adoption of ICT (reason not to adopt) in UPAREZ are as diversified as the issues related with ICT. The research was designed in such a way that respondents could choose from the listed ICT adoption barriers and if there are any additional barriers, the respondents could write them down on the space provided.

For this purpose, twenty two barriers in six groups were identified from the literature and interview. The groups are,

1. Business Strategies-ICT
2. Environmental Barriers
3. Economic factors- Organizational Barriers
4. Task Issue- Organizational Barriers
5. Management& Employee-Organizational Barriers
6. Affordability/Cost of ICT- Technological Barriers and
7. Easiness to Use- Technological Barriers

In each group, there are related barriers listed that selected respondents were required to fill questioner to state/identify which barrier limits ICT adoption. The result presented as follow.

Table 4.5: Barriers to ICT Adoption

SN	Barriers of ICT adoption	Frequency	Total	Percentage
1	Lack of perceived economic or other benefits to the unit	22	32	69%
2	New versions of existing software introduced too often (support fee)	22	32	69%
3	Lack of localization –Amharic user interface	22	32	69%
4	Expensive hardware/software	21	32	66%
5	Lack of government incentive	21	32	66%
6	Reluctance of personnel to use ICT	20	32	63%
7	Inadequate ICT strategy	20	32	63%
8	Lack of training& consulting	18	32	56%
9	The size of the unit is not feasible for ICT investment	16	32	50%
10	Customers are not prepared to use ICT	16	32	50%
11	Difficult to recruit qualified ICT personnel	15	32	47%
12	Inability of employees to use ICT	14	32	44%
13	Taxes are too high on hardware and software	13	32	41%
14	Fear of technology	13	32	41%
15	It is difficult to find reliable ICT suppliers	12	32	38%
16	Lack of ICT infrastructure	12	32	38%
17	Qualified personnel are expensive	10	32	31%
18	ICTs are too complicated	10	32	31%
19	The supply of ICT is not matching the ICT needs of the unit	8	32	25%
20	ICT expenditures are limited	8	32	25%
21	Unreliable legal ground for ICT investment	6	32	19%
22	Lack of security and privacy on the Internet	5	32	16%

Barriers identified by more than 50% of respondents are summarized in two level categorization and presented as follows.

Table 4.6: Summary of Barriers to ICT Adoption

SN	Barriers to Adopt ICT	Frequency	Total	%	Barriers to Adopt ICT			
					Sub Groups	%	Major Groups	%
1	Inadequate ICT strategy	20	32	63%	Business Strategies-ICT	63%	Business Strategies-ICT	63%
2	Lack of government incentive	21	32	66%	Environmental Barriers	66%	Environmental Barriers	66%
3	Lack of perceived economic or other benefits to the unit	22	32	69%	Management& Employee	66%	Organizational Barriers	66%
4	Reluctance of personnel to use ICT	20	32	63%				
5	Lack of localization-Amharic user interface	22	32	69%	Easiness to Use	63%	Technological Barriers	65%
6	Lack of training& consulting	18	32	56%				
7	New versions of existing software introduced too often (support fee)	22	32	69%	Affordability/Cost of ICT Economic factors	68%	-Technological Barriers -Organizational Barriers	
8	Expensive hardware/software	21	32	66%				

The process of adoption (acquiring and using) ICT on some SBUs were also raised as a barrier. Some SBUs sent staffs to operate the systems directly up on staff turnover, while others sent their staff for training first.

4.6 Factors affecting ICT adoption (reason to adopt) in UPAREZ

These factors are summarized to provide descriptive information about which factor affect ICT adoption of UPAREZ more.

For this purpose, twenty seven factors in seven groups were identified from the literature and interview. The groups are,

1. Business Strategies-Overall
2. Economic Factors- Organizational Factors
3. Task Issue- Organizational Factors
4. Management& Employee –Organizational Factors
5. Environmental
6. System Capabilities –Technological Factors
7. Proposed/Task Influence- Technological Factors

In each group, there are related sub factors. Selected respondents are required to fill questioner to state/identify which factor affects the ICT adoption in what rank (High, Medium and Low). For summery purpose respondents who have undecided ideas are assigned "Don't Know" the column.

4Table 4.7: Factors Affecting ICT Adoption

SN	Factors Affecting ICT Adoption	Ranks				
		H	M	L	DN	Total
1	Improved and quality service delivery	20	10	3	0	32
2	Expand the market geographically	15	14	2	1	32
3	Improved market performance	22	7	3	1	32
4	Company image considerations	13	14	5	0	32
5	Size (number of sales outlet or customer)	20	6	3	3	32
6	Centralized business management	23	7	1	1	32
7	Task specialization	17	11	3	1	32
8	Top management/owner support on ICT	24	8	1	0	32
9	Increased efficiency and effectiveness	20	9	1	2	32
10	Reduced business costs	19	11	1	1	32
11	Manager's innovativeness	11	15	5	2	32
12	Owners/Manager's ICT awareness	22	5	5	1	32
13	Customer pressure	15	13	2	2	32
14	Supplier Collaboration	19	10	1	3	32
15	Business partners' pressure	13	12	3	4	32
16	Competitive pressure	16	10	4	2	32
17	Availability of ICT infrastructure	5	21	5	3	32
18	Government's regulation and law	20	5	5	2	32
19	Government's support and initiative	16	10	5	1	32
20	Ease of use	20	8	2	2	32
21	Quality of IS systems and capabilities	19	9	3	1	32
22	Compatibility	16	13	2	1	32
22	Security	13	16	2	1	32
23	Autonomy	8	15	3	7	32
24	Speed up business processes	20	9	2	2	32
25	Extend beyond normal business hours	13	10	6	3	32
26	Launch new services	15	11	4	2	32
27	Link internal and external business processes	19	6	5	2	32

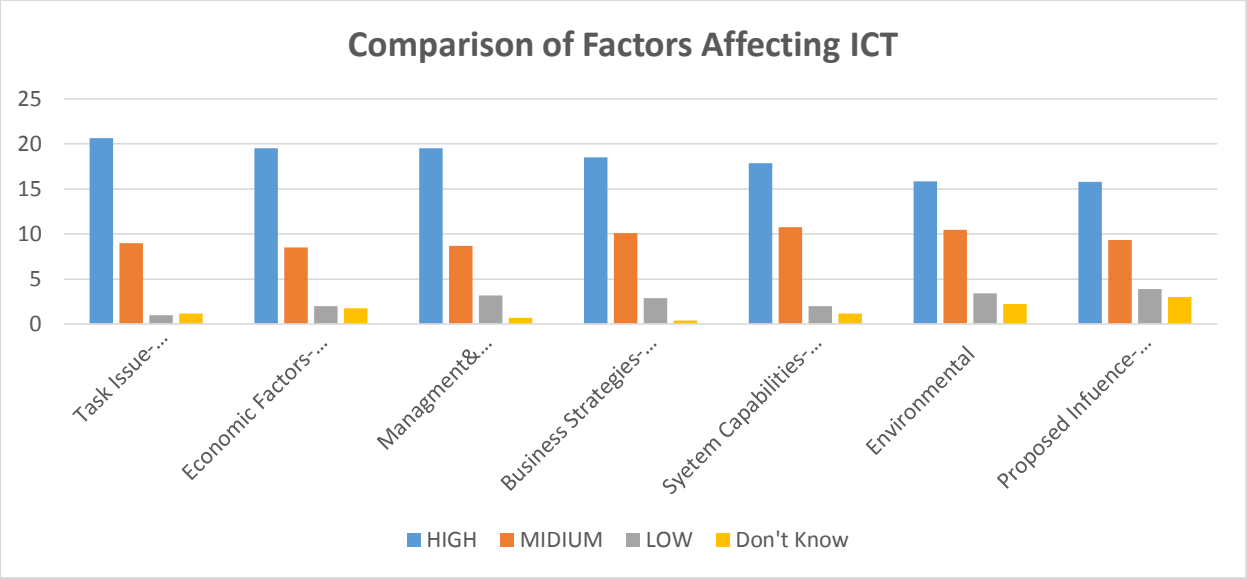


Figure 22.Comparison of Factors Affecting ICT Adoption

Table 4.8: Summary of Factors Affecting ICT Adoption

SN	Factors Affecting ICT Adoption	Ranks	Total	%	Factors Affecting ICT Adoption			
		High			Sub Groups	%	Major Groups	%
1	Ease of use	20	32	63%	System Capabilities-Technological Factors	61%	Technological Factors	61%
2	Quality of IS systems and capabilities	19	32	59%				
3	Speed up business processes	20	32	63%	Proposed Influence-Technological Factors	61%		
4	Link internal and external business processes	19	32	59%				
5	Size (number of sales outlet or customer)	20	32	63%	Economic Factors-Organizational Factors	61%	Organizational Factors	67%
6	Reduced business costs	19	32	59%				
7	Top management/owner support on ICT	24	32	75%	Management& Employee-Organizational Factors	72%		
8	Owners/Manager's ICT awareness	22	32	69%				
9	Centralized business management	23	32	72%	Task Issue-Organizational Factors	67%		
10	Increased efficiency and effectiveness	20	32	63%				
11	Government's regulation and law	20	32	63%	Environmental	61%	Environmental	61%
12	Supplier Collaboration	19	32	59%				
13	Improved market performance	22	32	69%	Business Strategies-Overall	66%	Business Strategies-Overall	66%
14	Improved and quality service delivery	20	32	63%				

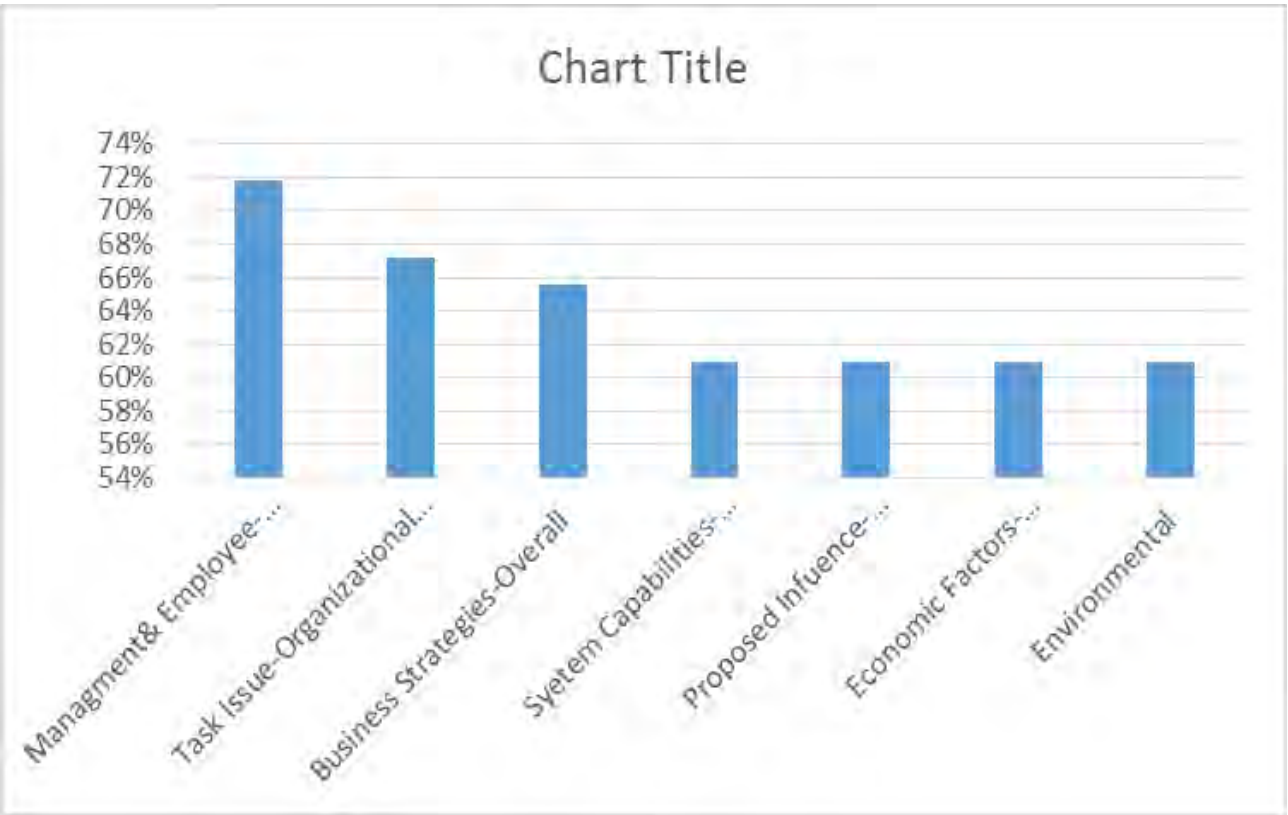


Figure 23.Factors Affecting ICT Adoption with High Rank

Organizational factors like management and employee support and awareness, centralization and efficiency of tasks and business strategies like improved market performance, were the most important factors that affects ICT adoption of UPAREZ.

4.7 Major Influences of ICT on UPAREZ

One of the objective of this research is finding the influences of ICT in a contextualized situation from the actual people who could notice the influence and the changes that are brought since the adoption of ICTs and ICT based services in the SBUs and Department of UPAREZ.

In addition to finding the influences of ICT, knowing the perception of the value of the influence, positive or negative, by the respondents was considered to be of an importance for competitiveness. The tendency of taking the influence of ICT as a positive and supportive for business process in all factors related with quality, staff development, or economic issues (cost) ultimately competitiveness was put to test to verify if it holds true. A respondent could choose the type of influence an issue has on the overall organizational activities from the list provided. The choices of the influence were positive, negative and no influence.

Table 4.9: Major Influences of ICT

SN	Issues of ICT Influence	ICT Influence				
		Positive	Negative	No Influence	Don't Know	Total
1	Quality of customer service	29	1	1	1	**32**
2	Reduction of operational cost	25	4	2	1	**32**
3	Efficiency of business processes	31	0	1	0	**32**
4	Flexibility/ adaptability of product	23	2	4	3	**32**
5	Productivity of employees	27	0	4	1	**32**
6	Motivation of staff	26	1	3	2	**32**
7	Staff development	26	1	3	2	**32**
8	Growth of revenue	26	1	2	3	**32**
9	Competitive advantage	28	1	1	2	**32**
10	Ease of structuring and restructuring	26	2	4	0	**32**

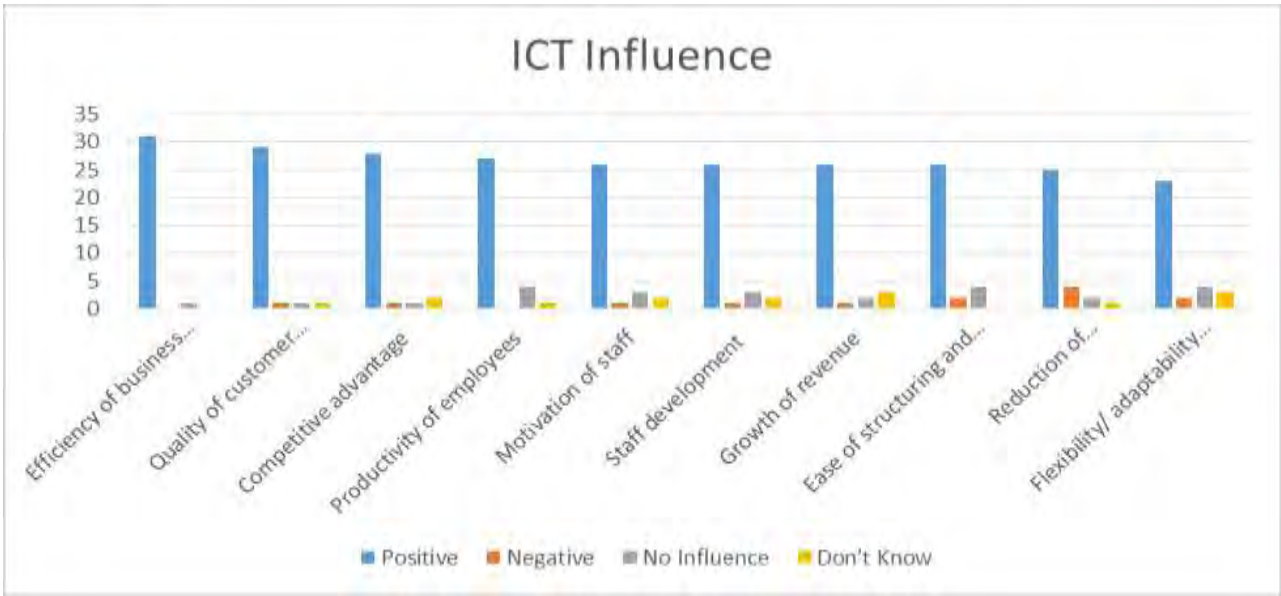


Figure 24.ICT Positive Influence

Consequently, the major issues in positive influence were

- Efficiency of business processes
- Quality of customer service
- Competitive advantage
- Productivity of employees
- Staff development
- Motivation of staff
- Growth of revenue
- Ease of structuring and restructuring
- Reduction of operational cost
- Flexibility/ adaptability of product in their order of influence.

On the same ground of comparing factors with each other, some factors indicated more negative influence than others do.

- Reduction of operational cost
- Ease of structuring and restructuring
- Flexibility/ adaptability of product
- Quality of customer service
- Competitive advantage
- Motivation of staff
- Staff development
- Growth of revenue
- Efficiency of business processes
- Productivity of employees

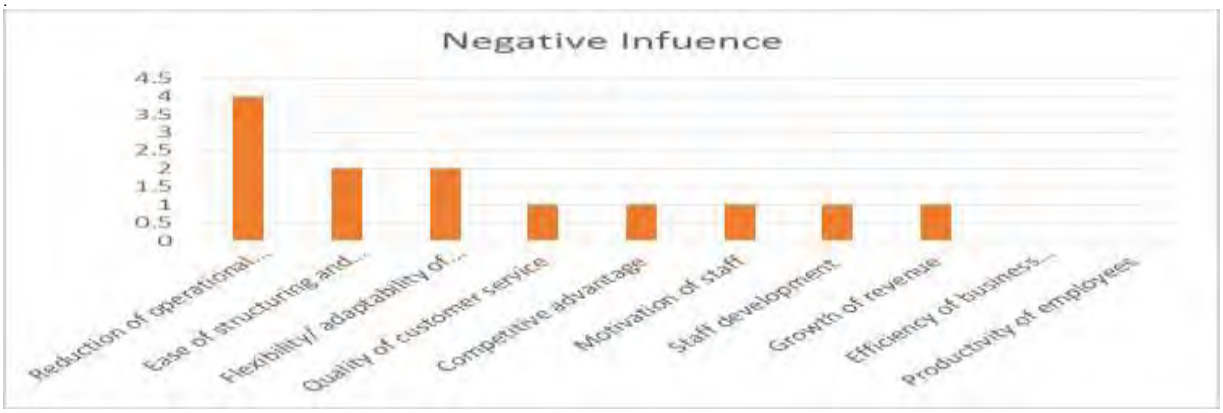


Figure 25.ICT Negative Influence

In addition, issues with no influence were

- Ease of structuring and restructuring
- Flexibility/ adaptability of product
- Productivity of employees
- Motivation of staff
- Staff development
- Reduction of operational cost
- Growth of revenue
- Quality of customer service
- Competitive advantage
- Efficiency of business processes

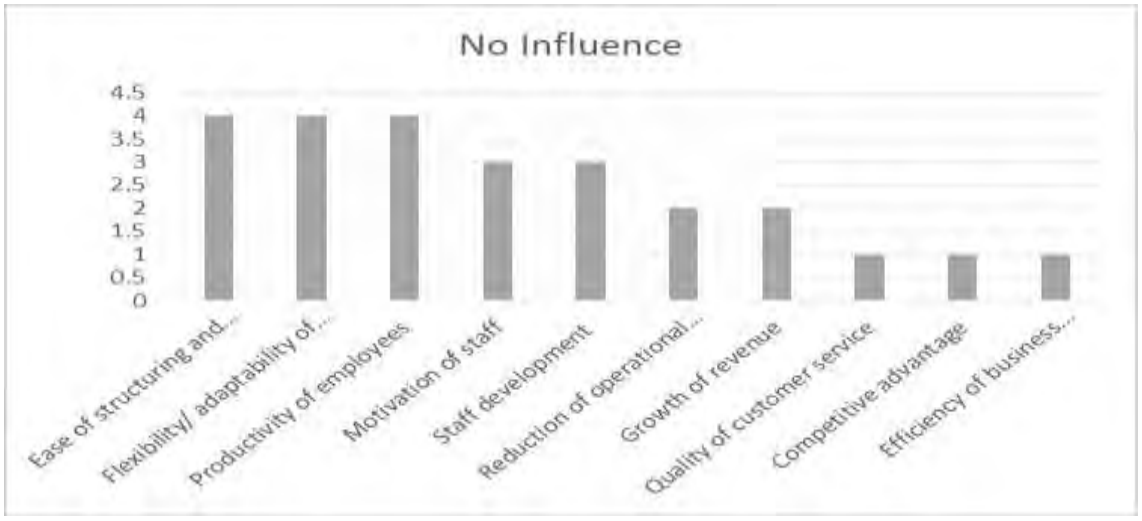


Figure 26.ICT No Influence

The below were number of respondents who did not know the following influence of ICT in their order.

- Flexibility/ adaptability of product
- Growth of revenue
- Motivation of staff
- Staff development
- Competitive advantage
- Productivity of employees
- Reduction of operational cost
- Quality of customer service

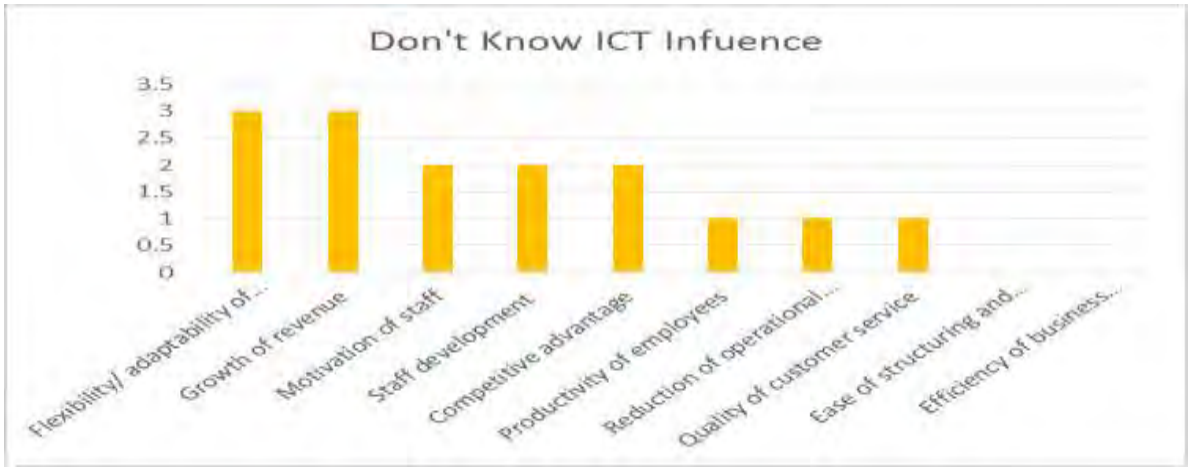


Figure 27. Don't Know the Influence of ICT

The ICT department was commented by the respondents to organize intensive and extensive training on the systems implemented to support the effective adoption of the ICTs. The group of respondents who agreed on the insufficiency of the current support has suggested points that should be included in the training.

5. Summary, Conclusion and Recommendations

The research which has started with questions to answer and objectives to achieve has come a long way passing through many vital processes; data collection and analysis could be regarded as the prominent ones. The last chapter of this document is about summarization of the research's findings, implication of the research results from the perspective of the researcher and suggestions designed to pave the way for related researches. It includes four major topics: research question, conclusion, recommendation, and further research.

5.1 Summary

POS and Doc Synchronization were systems used across all parts of the company. Government has a great concern on software that handle sales in relation to tax collection

Except CRM and website, UPAREZ has invested on its IT infrastructure in order to maintain its competitiveness through ICT. Peachtree accounting software substituted the failed CNET accounting system and incur additional cost to interface/integrate it with the point of sales (POS) which in turn avoids bulk document posting in accounting department.

Majority of the ICTs were acquired due to the company's centralized management strategy, top management/owner support on ICT, government law and supplier collaboration. However, the use (utilization) of the ICT limited by the way of system orientation and employee perception. Some SBUs directly assigned staffs to operate the systems, while others sent their staff for training first in order to avoid reluctance of personnel to use ICT.

Thus from the above summary of results the company informal model to adopt ICT could be summarized as follow.

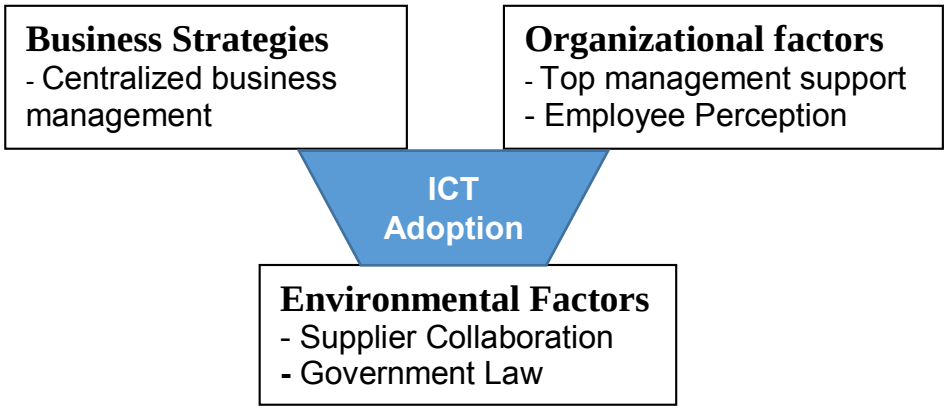


Figure 28.Existing Model to Adopt ICT by UPAREZ: Source: (Own Summarization)

The 50% of the respondents (16 out of 32) stated that the barriers to adopt ICT in UPAREZ were inadequate ICT strategy, lack of government incentive, lack of perceived economic or other benefits to the unit, reluctance of personnel to use ICT, lack of localization-Amharic user interface, lack of training& consulting, new versions of existing software introduced too often (support fee) and expensive hardware/software. (Demeke, 2014) hotel and associated businesses resistance factors that act as a barrier for the adoption of ICT arise from the political, economic, and social policies followed by the government. There are technological characteristics of ICT that act as a barrier for the adoption of ICT in the sector. The monopolistic structure of the telecommunications sector is a significant factor for the non-adoption of ICT. Thus, the result of this study also go in line with Demeke. (Kumlachew, 2015) also concluded that to adopt and implement new technology, resistant to change, lack of budget, lack of skilled worker and lack of technical supporting services are very influential barriers in order of priorities. Other inhibitors include lack of strategic perspective and government support that influence firm's technology adoption and implementation.

Top management/owner support on ICT, centralized business management, owners/manager's ICT awareness, improved market performance, ease of use, speed up business processes, size (number of sales outlet or customer), increased efficiency and effectiveness, government's regulation and law, improved and quality service delivery, quality of IS systems and capabilities, link internal and external business processes, reduced business costs and supplier collaboration were factors affects ICT adoption identified by more than 50% of the respondents. (Kumlachew et al., 2014) are also identified the above lists as factors affecting ICT adoption in textile and hotel industry.

More than 70% of respondents know ICT has a positive influence on efficiency of business processes, quality of customer service, competitive advantage, productivity of employees, growth of revenue, motivation of staff, staff development, ease of structuring and restructuring, reduction of operational cost, flexibility/ adaptability of product in one way or other. This result also go in line with (Kumlachew, 2015) study.

However, UPAREZ has facing some discrepancy in utilization of ICT like late report due to the barriers stated above-reluctance of personnel to use ICT.

5.2 Conclusions

5.2.1 What are the ICT adopted in UPAREZ?

UPAREZ has invested a lot on its IT infrastructure in order to maintain its competitiveness through ICT. Almost all SBUs and departments were supported by enterprise information systems in one way or other and synchronized with head office. However, similiar utilization of ICT depending on the usage by corresponding SBU and department

POS and Doc Synchronization were systems used across all parts of the company. Government has a great concern on software that handle sales in relation to tax collection. However, factors from the users of CRM and Web site are supposed to affect ICT adoption weakly as the two systems were not implemented at all in the company

In the process of adoption (acquiring and using) ICT some SBUs directly assigned staffs to operate the systems, while others sent their staff for training first. SBUs that follow the right adoption process are relatively successful in exploiting the system and meeting report deadlines.

ICT adoption basically decided only by the company's centralized management strategy, top management/owner support on ICT, government law and supplier collaboration. The current informal model summarized from above limited factors affecting ICT adoption could not be all-inclusive. It lack many other factors and barriers important to ICT adoption that discussed in the literature and empirical review. Some comprehensive and a custom made ICT adoption model for the company is become crucial to optimize the benefit out of it.

5.2.2 What are the major barriers of ICT adoption in UPAREZ?

The findings show the major reasons that were hindering ICT adoption are a group of factors that are related with the technological issues of the company: lack of localization-Amharic user interface, lack of training& consulting and new versions of existing software introduced too often (support fee)

In addition, organizational factors-management& employee have proved to be among the major factors with issues like reluctance of personnel to use ICT. Generally, the barriers of ICT were of inadequate ICT strategy, lack of government incentive, lack of perceived economic or other benefits to the unit, reluctance of personnel to use ICT, lack of localization-Amharic user interface, lack of training& consulting, new versions of existing software introduced too often (support fee) and expensive hardware/software, which creates inconsistent ICT adoption in SBUs and departments on UPAREZ.

5.2.3 What are the most important factors affecting ICT adoption in UPAREZ?

The factors were assessed in a three rank amount: high, medium, and low level. The result displays top management/owner support on ICT, centralized business management, owners/manager's ICT awareness, improved market performance, ease of use, speed up business processes, size (number of sales outlet or customer), increased efficiency and effectiveness, government's regulation and law, improved and quality service delivery, quality of IS systems and capabilities, link internal and external business processes, reduced business costs and supplier collaboration factors consecutively

motivated UPAREZ to implement ICT in high rank. Some of the factors are supported by the result of the research about barriers to adopt ICT in the above statement that is that creates inconsistent ICT adoption in SBUs and departments on UPAREZ.

5.2.4 Influence of ICT Adoption in UPAREZ.

Significant number of respondent (70%) responded that ICT could contribute positively towards the competitiveness of UPAREZ in one way or other through its influence on

- Efficiency of business processes
- Quality of customer service
- Competitive advantage
- Productivity of employees
- Staff development
- Motivation of staff
- Growth of revenue
- Ease of structuring and restructuring
- Reduction of operational cost
- Flexibility/ adaptability of product in their order of influence.

These influence are a base for competitive advantage that can lead and related to two broad types of competitive advantage: lower cost or differentiation (uniqueness) (Porter, 1985).

In contrast to the above result there were also respondents who perceive ICT has negative influence and no influence. Few also did not know some of influences of ICT.

Influence of ICT has not been yet utilized fully around staff and staff development. The need for training on ICT is still very important since the results include some of staff related factors under no influence: productivity of employees, staff development and training, and motivation of staff and ease of organizational structuring and restructuring in order to have an extra positive perception and increase the contribution of ICT towards the competitiveness of the company.

5.2.5 What should be the model to adopt ICT in UPAREZ?

Since, the major objective of this research was developing ICT adoption model from the perspective of what is motivating UPAREZ to adopt ICT, one can extract the fact that the outcome is ICT adoption while the causes are the factors that affecting ICT. Information concerning which factor affects ICT adoption was gathered from the respondents and ranked accordingly.

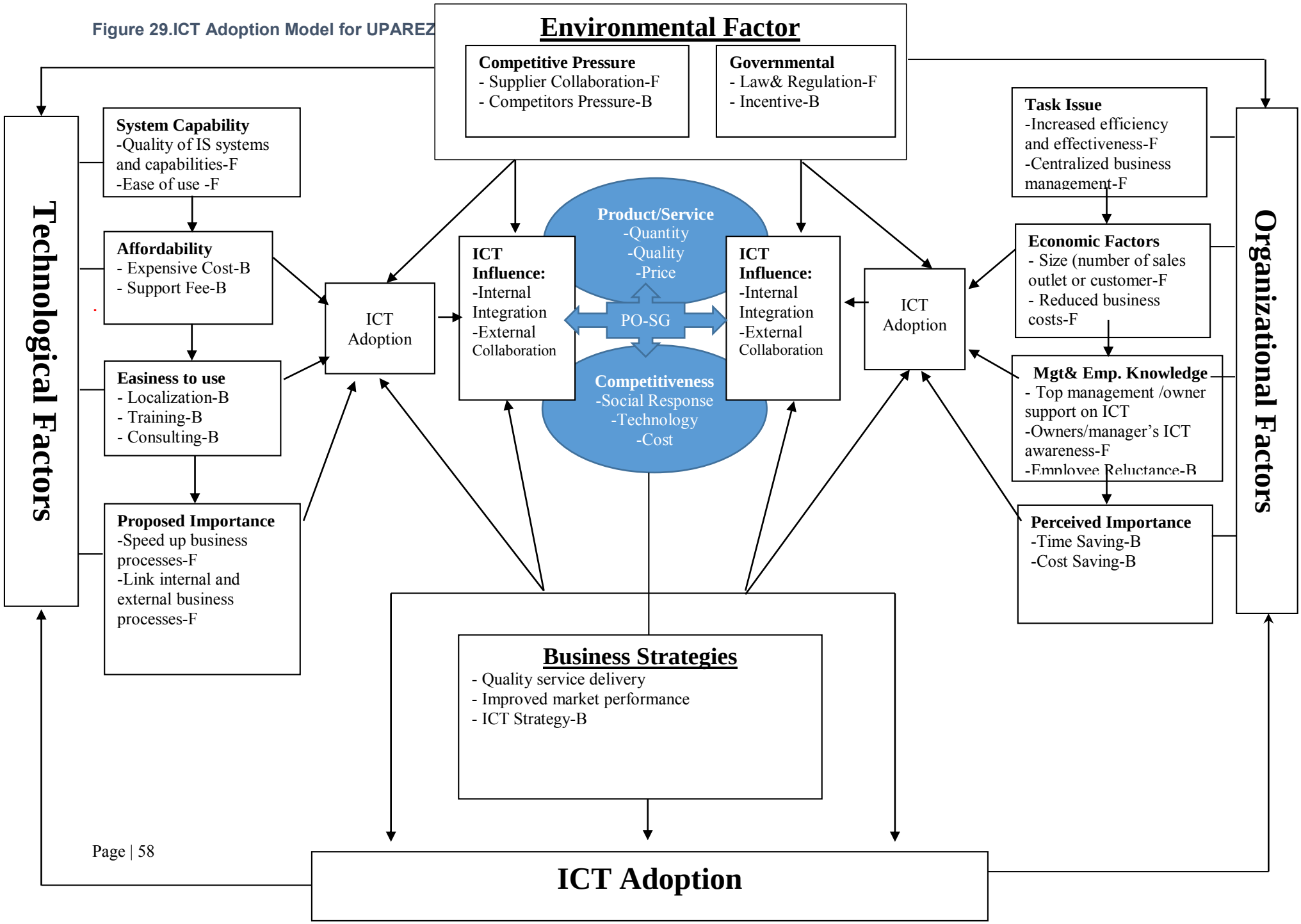
On the other hand the barriers identified also indicate what is resisting UPAREZ to adopt ICT. Understanding the barriers in a reversed way could relate the issue of factors affecting ICT adoption positively.

Therefore, the process of model formation for this research was based on the above findings, the literature and the initial conceptual framework. This needs categorization of similar factors into their next high level classification and then putting/structuring different high level factors in hierarchy and finally organizing all factors in exchange and equilibrium to conclude the model and through that achieve long term survival (with profitability, market share and all the other societal strategic)

Thus, the model are to be used both the most important factors affecting ICT adoption and the major barriers to adopt ICT as an input.

The factors and the barriers identified are to be the major constructs of the model which basically came from the result of the research (please refer the appendix). The model shows the effects of ICT adoption towards the competitiveness of UPAREZ-resulted in profit optimization (PO) and sustainable growth (SG) based on technology diffusion model and unified theory of acceptance and use of technology model.

Figure 29.ICT Adoption Model for UPAREZ



5.3 Recommendations

Based on the findings and conclusions drawn from the study, the researcher forwards the following important recommendations.

The way started by the company can be taken as a good beginning with a promise of growth. The way started by the company can be taken as a good beginning with a promise of growth. However, minimizing the barriers related with organizational factors and business strategies need to be done continuously.

ICT adoption difference among SBUs and departments has to be solved and similarity in utilization need to be emplaced across the units of the company. A custom made model developed can help the standardization of the ICT adoption.

As the study found, the management and employee support and awareness are factors that determine company's decision to adopt ICT. The first step for the top management is to establish the nature of skill provision and the needs, and the gaps between the two that need to be remedied. This requires conducting a 'need assessment' at the SBUs and head office level, accompanied by an assessment of the capabilities, staffing, curricula and facilities.

In order to understand and optimize the contemporary impact of ICT on competitiveness, the influence of ICT has to be assessed periodically.

UPAREZ and similar SMEs has to be supported through proper incentives including tax credits for ICT adoption because lack of government incentive and high cost of hardware and software were one of the barriers identified in ICT adoption

Finally, the benefits of the research could be limited to UPAREZ only on identifying major barriers of ICT adoption, understanding the important factors affecting ICT and knowing the current perception of ICTs influence towards competitiveness. Therefore the researcher recommends future studies that focus on longitudinal approach would be also valuable to study ICT adoption of UPAREZ over time and determine influential factors for other similar SMEs.

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Appendix:
A. Questionnaire

Dear Sir/ Madam,

I am a graduate student in the Department of management of the Faculty of Business and Economics at Addis Ababa University. I am conducting a research study for my Master's thesis in partial fulfillment of the requirements for the EMBA degree in Business Administration.

The attached questionnaire is designed to gather information from you in the capacity as the ICT or Department manager or officer, of UPAREZ Business PLC, to be used only for the intended purpose of the research.

I hereby request your participation in completing the questionnaire, and would be grateful for your cooperation and valuable time.

Sincerely,

Meengistu G/Yohannes

1. Please state your position or title_____
2. Please state your department or SBUs_____
3. What are the ICTs and ICT related services your company has implemented currently? (tick as many as appropriate)

SN	ICTs and ICT related services	Tick
A	**Device/Hardware's**	
1	Server	☐
2	Computer	☐
3	Mobile	☐
4	Switch	☐
5	Router	☐
B	**Information System (Software)**	
6	Point of Sale	☐
7	Inventory Management System	☐
8	Production Management System	☐
9	HRM Management System	☐
10	Property Management System	☐
11	Fleet Management System	☐
12	Accounting Management System-CNET	☐
13	Accounting Management System-Peachtree	☐
14	System Interfacing	☐
15	Document Sharing	☐
16	Customer Relation Management	☐
17	Supply Chain Management	☐
18	Web site	☐
C	**Internet Service**	
19	Fixed	☐
20	Wireless	☐
D	**Networking**	
21	LAN	☐
22	WAN	☐
E	**Integration/Consulting**	
23	Peachtree Interfacing	☐
24	Consultancy	☐

Other, please specify

_____
_____
_____

4. Please select from the following items those that appropriately describe the rank of your SBU or department decision to adopt ICT.

SN	Factors Affecting ICT Adoption	Ranks			
		HIGH	MED	Low	Don't Know
1	Improved and quality service delivery	☐	☐	☐	☐
2	Expand the market geographically	☐	☐	☐	☐
3	Improved market performance	☐	☐	☐	☐
4	Company image considerations	☐	☐	☐	☐
5	Size (number of sales outlet or customer)	☐	☐	☐	☐
6	Centralized business management	☐	☐	☐	☐
7	Task specialization	☐	☐	☐	☐
8	Top management/owner support on ICT	☐	☐	☐	☐
9	Increased efficiency and effectiveness	☐	☐	☐	☐
10	Reduced business costs	☐	☐	☐	☐
11	Manager's innovativeness	☐	☐	☐	☐
12	Owners/Manager's ICT awareness	☐	☐	☐	☐
13	Customer pressure	☐	☐	☐	☐
14	Supplier Collaboration	☐	☐	☐	☐
15	Business partners' pressure	☐	☐	☐	☐
16	Competitive pressure	☐	☐	☐	☐
17	Availability of ICT infrastructure	☐	☐	☐	☐
18	Government's regulation and law	☐	☐	☐	☐
19	Government's support and initiative	☐	☐	☐	☐
20	Ease of use	☐	☐	☐	☐
21	Quality of IS systems and capabilities	☐	☐	☐	☐
22	Compatibility	☐	☐	☐	☐
23	System security	☐	☐	☐	☐
24	Autonomy	☐	☐	☐	☐
25	Speed up business processes	☐	☐	☐	☐
26	Extend beyond normal business hours	☐	☐	☐	☐
27	Launch new services	☐	☐	☐	☐
28	Link internal and external business processes	☐	☐	☐	☐

5. Please specify, if ICT has any influence or no influence at all in the following areas.

SN	Influences of ICT	Influence			
		Positive	Negative	No Influence	Don't Know
1	Flexibility/adaptability of product	☐	☐	☐	☐
2	Reduction of operational cost	☐	☐	☐	☐
3	Efficiency of business processes	☐	☐	☐	☐
4	Quality of customer service	☐	☐	☐	☐
5	Productivity of employees	☐	☐	☐	☐
6	Motivation of staff	☐	☐	☐	☐
7	Staff development	☐	☐	☐	☐
8	Growth of revenue	☐	☐	☐	☐
9	Competitive advantage	☐	☐	☐	☐
10	Ease of structuring and restructuring	☐	☐	☐	☐

6. What are the barriers of ICT adoption in your SBU or department? (Tick as many as appropriate and specify any other)

SN	Barriers of ICT adoption	Tick
1	Lack of perceived economic or other benefits to the unit	☐
2	The size of the unit is not feasible for ICT investment	☐
3	Fear of technology	☐
4	Reluctance of personnel to use ICT	☐
5	Inability of employees to use ICT	☐
6	Customers are not prepared to use ICT	☐
7	ICTs are too complicated	☐
8	Lack of localization- Amharic user interface	☐
9	Lack of training& consulting	☐
10	It is difficult to find reliable ICT suppliers	☐
11	The supply of ICT is not matching the ICT needs of the unit	☐
12	ICT expenditures are limited	☐
13	Expensive hardware/software	☐
14	New versions of existing software introduced too often (support fee)	☐
15	Difficult to recruit qualified ICT personnel	☐
16	Qualified personnel are expensive	☐
17	Taxes are too high on hardware and software	☐
18	Unreliable legal ground for ICT investment	☐
19	Lack of security and privacy on the Internet	☐
20	Lack of ICT infrastructure	☐
21	Lack of government incentive	☐
22	Inadequate ICT strategy	☐

Other, please specify

_____

B. Constructs of a Custom Made Model to Adopt ICT

The most important factors affecting ICT adoption are organized and presented as follows.

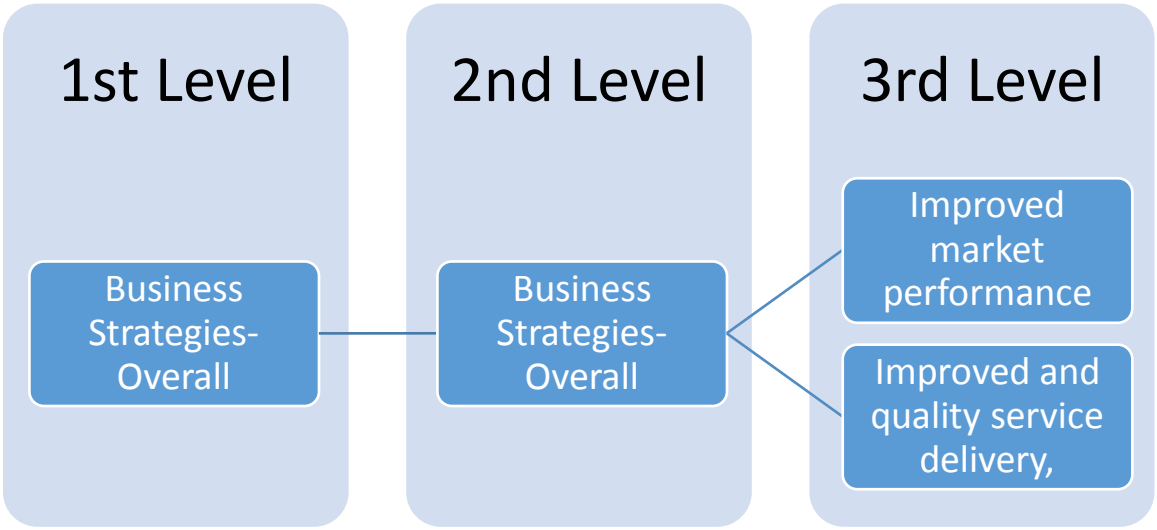

Figure 30.Factors Affecting ICT Adoption-Business Strategies-Overall

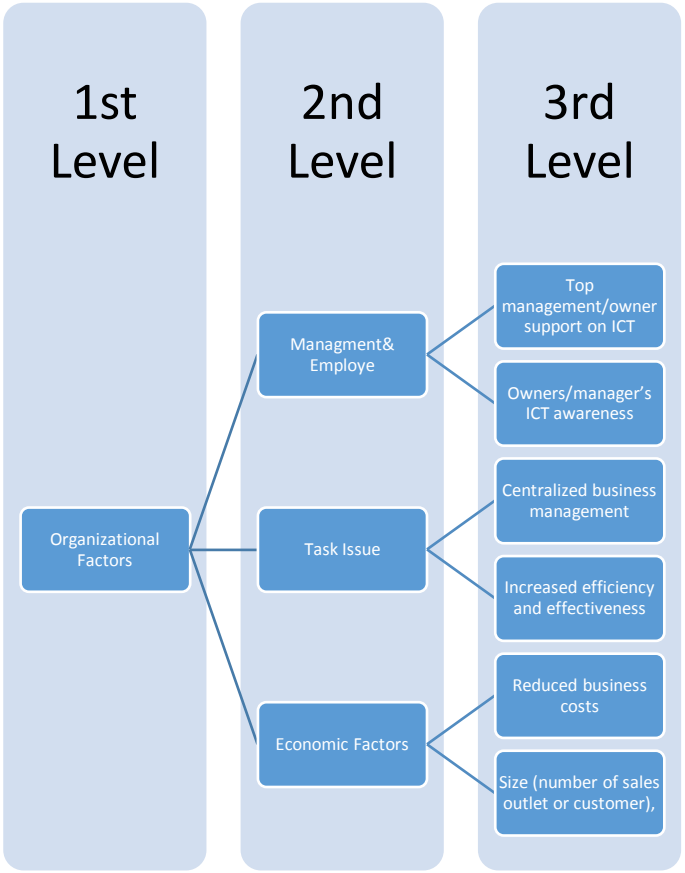

Figure 31.Factors Affecting ICT Adoption-Organizational Factors

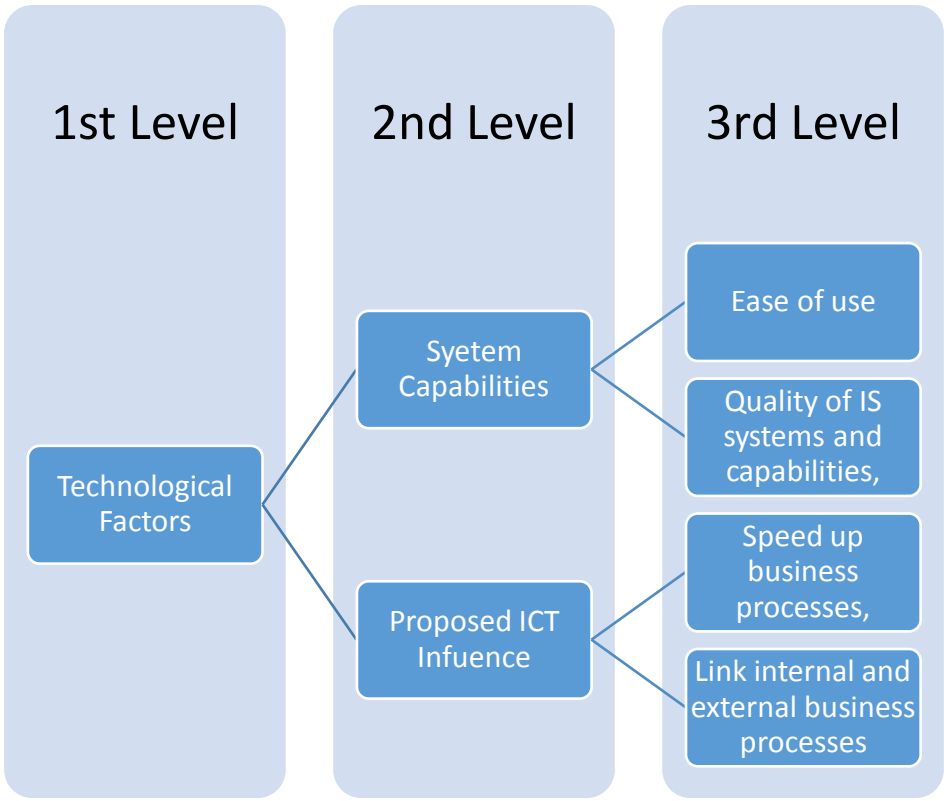

Figure 32.Factors Affecting ICT Adoption-Technological Factors

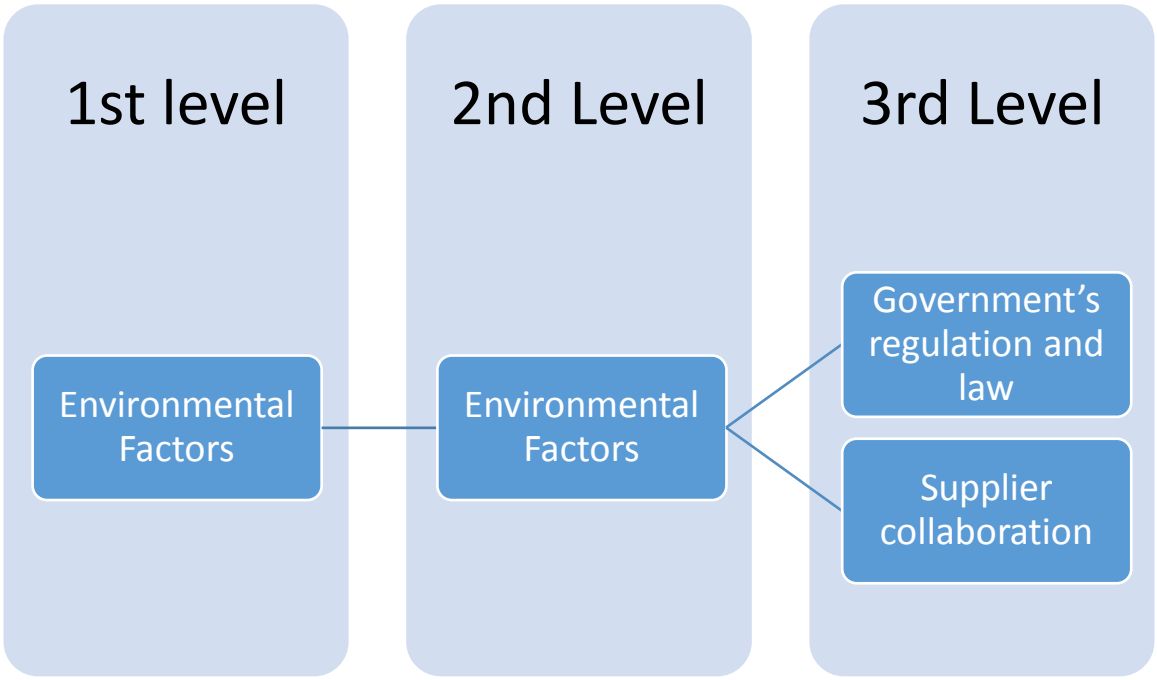

Figure 33.Factors Affecting ICT Adoption-Environmental Factors

The major barriers to adopt ICT also organized and presented as follow.

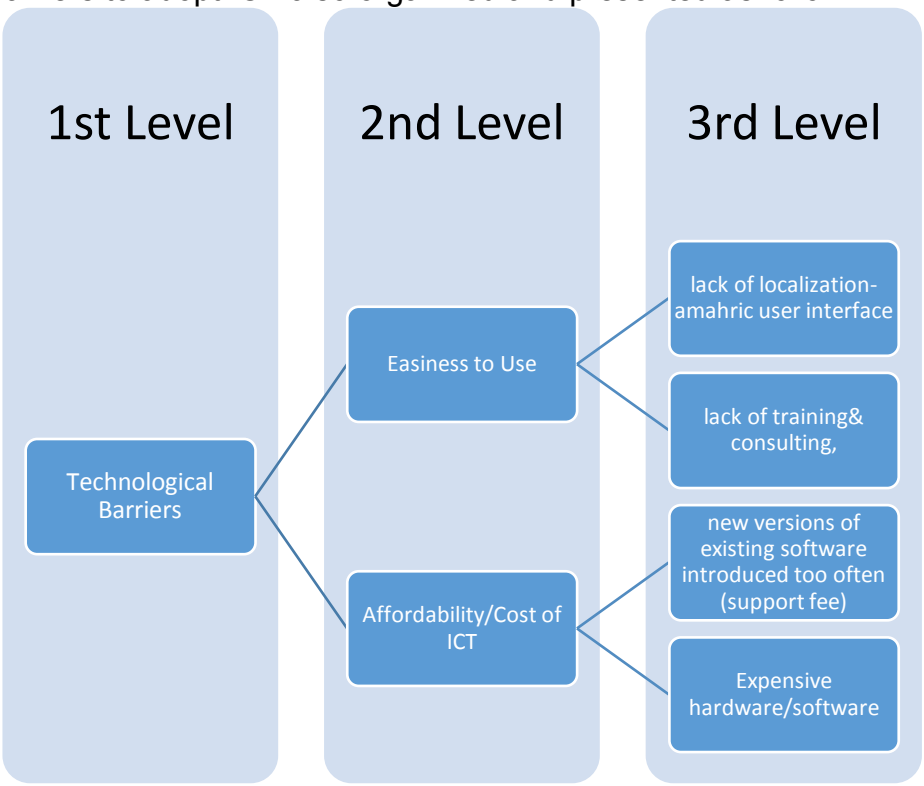

Figure 34.Barriers to Adopt ICT- Technological Barriers

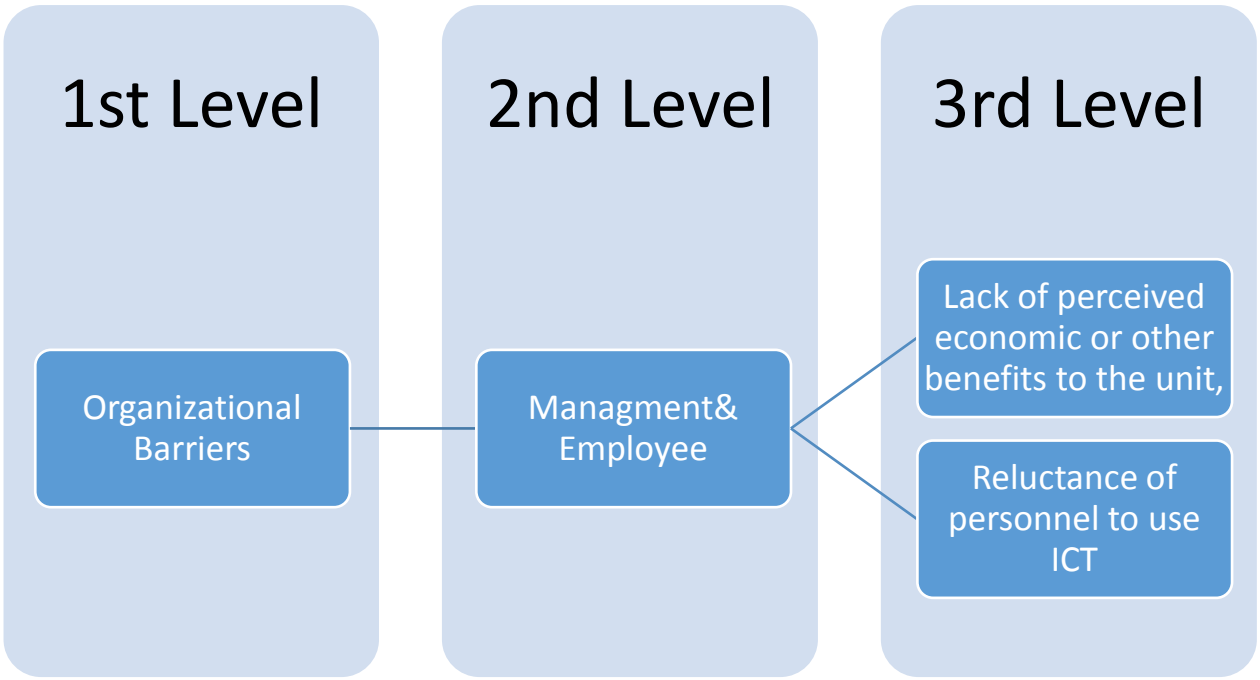

Figure 35.Barriers to Adopt ICT- Organizational Barriers

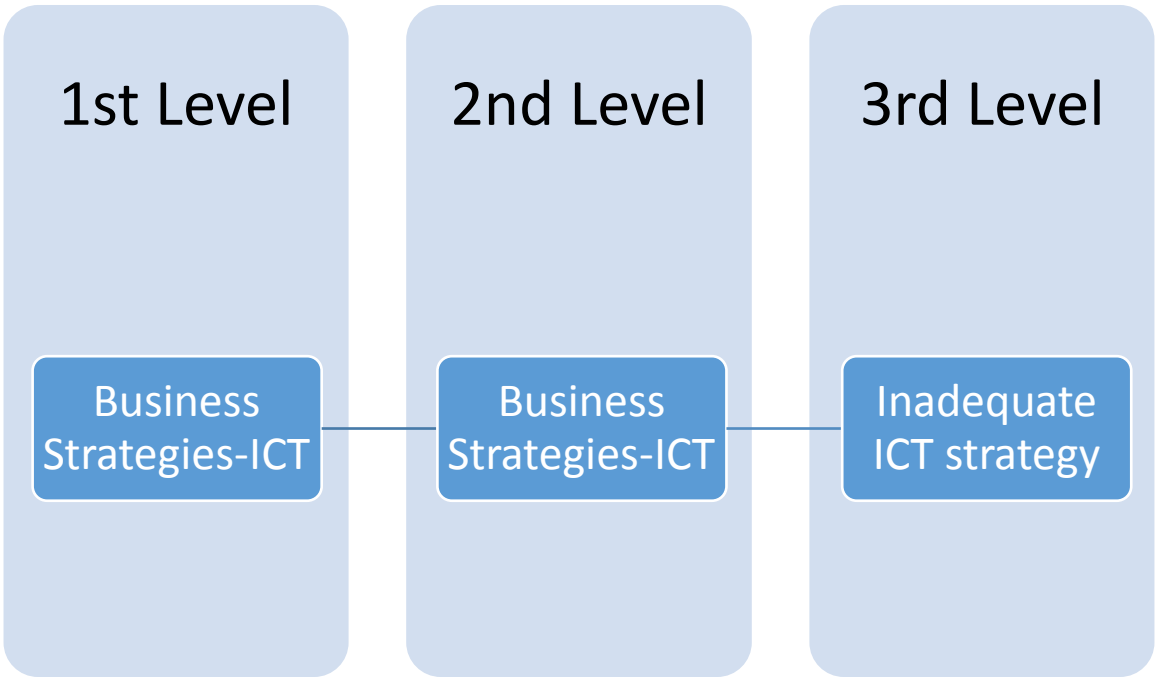

Figure 36.Barriers to Adopt ICT- Business Strategies-ICT

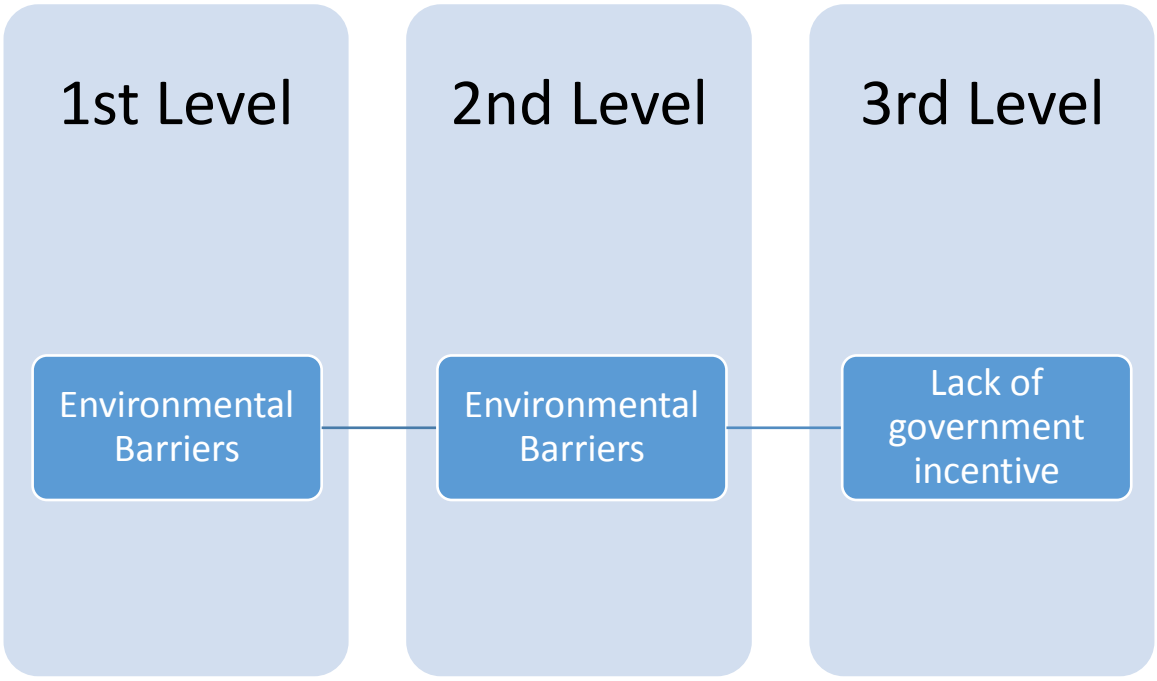

Figure 37.Barriers to Adopt ICT- Environmental Barriers

Thank You!