

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

INSTITUTE OF DISTANCE LEARNING

**E-BUSINESS AS A TOOL FOR MANAGING THE VALUE CHAIN OF
EDUCATIONAL PROGRAMMES OF HO POLYTECHNIC**

BY

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MAY 2009

CERTIFICATION

I, Simon Amegashie-Viglo, do hereby solemnly declare that this EMBA thesis is entirely my own work carried out under the supervision of Mr Dodji Attiogbe of the Institute of Distance Learning University of Science and Technology, Kumasi, Ghana. To the best of my knowledge, the thesis contains no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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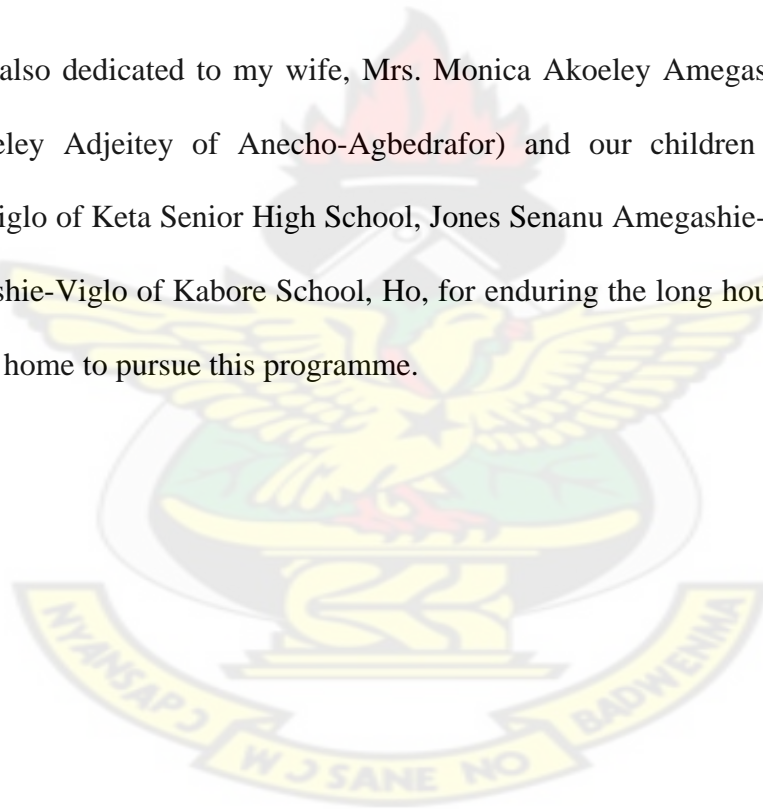
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DEDICATION

This thesis is dedicated to the memory of my father, the late Stephen Amegashie-Viglo, popularly known as Agbodzihu Kposu, who died on the 13th December 1979, whilst I was in Lower Sixth Form, at Kadjebi Secondary School and my mother, Atsufui Ekpe; the Amegashie family of Keta, Atiavi and Anyako, and the Agbemetsi and Viglo families of Lume and Agbedrafor, for providing me with identity and the environment for discovering my potentials in life.

The thesis is also dedicated to my wife, Mrs. Monica Akoeley Amegashie-Viglo, (Nee Monica Akoeley Adjeitey of Anecho-Agbedrafor) and our children Joshua Elikem Amegashie-Viglo of Keta Senior High School, Jones Senanu Amegashie-Viglo and Juliet Dzifa Amegashie-Viglo of Kabore School, Ho, for enduring the long hours I have had to be away from home to pursue this programme.



ABSTRACT

The study explored the use of e-business as a tool for managing the value chain activities of Ho Polytechnic. The main objective of the research was to examine the challenges and constraints facing the Polytechnic in applying e-business to its value chain activities and the efforts being made to overcome the challenges and constraints. Questionnaires were administered among 100 management and academic staff of the Polytechnic to find answers to the issues raised. Key management staff of the Polytechnic were interviewed on the ICT agenda of the Polytechnic. The research revealed that the Polytechnic was facing challenges and constraints like; unreliable Internet connectivity, unstable power supply that was resulting in damage to equipment, limited number of networked computers and a lack of competence among staff in some computer applications. The study also found out that there is a good understanding among respondents, of e-business and the benefits of applying it to the value chain activities of the institution to reduce cost improve efficiency and maximise productivity. To confront the challenges and constraints, the Polytechnic has crafted an ICT Policy; contracted SocketWorks Global to automate and upgrade ICT facilities of the institution and to train staff in the use of the facilities. The research discovered that SocketWorks Global was finding it difficult to deliver its obligations under the contract. The study recommends a review of the contract with SocketWorks Global to guarantee value for money to the Polytechnic and to facilitate the application of e-business as a tool for managing the value chain operations of the institution.

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ABBREVIATIONS/ACRONYMS

B. Tech	-	Bachelor in Technology
B2B	-	Business to Business
B2C	-	Business to Customers
DBS	-	Diploma in Business Studies
E-Business	-	Electronic Business
E-Commerce	-	Electronic Commerce
E-mail	-	Electronic Mail
E-Marketplace	-	Electronic Marketplace
G.E.S	-	Ghana Education Service
GETFund	-	Ghana Education Trust Fund
HND	-	Higher National Diploma
ICT	-	Information Communication Technology
ICT4D	-	Information Communication Technology for Development
LAN	-	Local Area Network
MB	-	Mega Bytes
NCTE	-	National Council for Tertiary Education
OPAC	-	Online Public Access Catalogue
PNDC	-	Provisional National Defence Council
SPSS	-	Statistical Package for Social Scientists
SWOT	-	Strengths, Weaknesses, Opportunities and Threats
TRS	-	Technical Report Series
WWW	-	World Wide Web

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 Introduction

In 2003, Ghana launched an Information Communication and Technology (ICT) Policy for Accelerated Development (ICT4AD Policy). The Policy seeks, among other things, to address the development challenges of Ghana and accelerate her socio-economic development process through the development, deployment and exploitation of ICT. The basic motivation of the Policy is that the accelerated development of Ghana, within the emerging information and digital age, will not be possible without an ICT-driven development agenda (Republic of Ghana, 2003).

The Policy's overall objective is to 'engineer an ICT-led socio-economic development process with the potential of transforming Ghana into a middle income, information rich, knowledge-based and technology driven economy' (Republic of Ghana, 2003). The Policy has 13 specific objectives. For the purposes of this study, the 5th and 6th policy objectives of the ICT4AD Policy are particularly relevant. They are:

- 'To aid the process of the development of national human resource capacity and the nation's research and development capabilities to meet the changing needs and demands of the economy.'
- 'To promote an improved educational system within which ICT is widely deployed to facilitate the delivery of educational services at all levels' (Republic of Ghana, 2003).

On the deployment and exploitation of ICT for accelerated national development, the following specific objectives on promoting ICT in education were outlined. The specific objectives were to:

- Facilitate the deployment, utilisation and exploitation of ICT within the educational system to improve on educational access and delivery and to support teaching and learning from primary school and beyond.
- Modernise the educational system to improve the quality of education and training at all levels of the educational system and expanding access to educational, training and research resources and facilities,
- Orientate all levels of the country's educational system to the teaching and learning of science and technology in order to accelerate the spread of science and technology in society and produce a critical mass of requisite human resource and a well informed citizenry,
- Achieve universal basic education and improve the level of basic computer literacy in the country,
- Ensure that all citizens are at least functionally literate and productive,
- Expand and increase access to secondary and tertiary education, and
- Strengthen science education at all levels in all aspects of the educational system (Republic of Ghana, 2003:33-34).

These objectives of the ICT4AD Policy, throw a great challenge to all educational institutions, particularly the tertiary institutions, to re-examine their modus operandi, re-align their strategies with emphasis on the deployment and exploitation of ICT for educational service delivery in order to reduce cost, maximise productivity, improve efficiency and achieve a competitive advantage.

The concept of the 'value chain' was introduced in 1985, by Professor Michael Porter of Harvard Business School, in his book *Competitive Advantage: Creating and Sustaining Superior Performance*. Porter's argument is that getting competitive advantage by reducing cost and charging less should be understood and planned for through the total activities that a company performs (Kaplan & Norton, 1992). By splitting these activities into 'strategically relevant' groups, managers should be able to understand the behaviour of costs as well as work out potential sources of differentiation (Burn, 2007).

Value has been defined by Burn (2007) as 'the amount buyers are willing to pay' for a product or a service. The value chain analysis in the opinion of Shank & Govindarajan (1993) is the breaking down of business functions or production processes into separate and strategically relevant activities for purposes of understanding the behaviour of cost and the sources of differentiation of these activities. For example, human resource could be divided into recruitment, training, development, compensation and personnel. The value chain is a series of interdependent and interconnected activities in the process of production of value (Shank & Govindarajan, 1993).

E-business is the conduct of business on the Internet. E-business depends on the use of web technology tools like the -Internet, Extranet the Intranet and a Local Area Network (LAN) system to carry out business transactions like; advertising, promotion of products, sending and receiving of purchase requests, invoices, inventory control, billing of retailers and electronic payments. E-business is a paperless transaction, meant to save cost and put an organisation at a competitive advantage (Burn, 2007). Heavy expenditure is incurred by most organisations on the creation, handling and storage of paper documents in the form of

request for proposals, purchase orders, shipping documents, invoices, payment approvals and cheques among others. Tertiary institutions in Ghana are no exception to this problem. The potential advantage in the deployment and exploitation of e-business in education delivery in order to reduce cost, maximise productivity and improve efficiency, is the subject matter of investigation in this research.

In making the case for e-business, the real and potential competitive advantages in terms of cost reduction are paramount. The following are the real and potential benefits associated with an e-business venture. E-business:

- Introduces your organisation and staff to the public by displaying their resumes and pictures on the Internet.
- Strengthens relationships and the ability to market additional services to existing and potential clients.
- Ensures availability of information twenty-four hours per day at minimum cost and with minimum resources.
- Promotes interactive communications with clients.
- Strengthens recruitment processes and procedures (www.thewebseye.com).
- Reduces cost, in terms of paper.
- Eliminates private network charges.
- Improves process efficiency through work flow redesign.
- Permits outsourcing of functions and linkages to customers and suppliers through collaborative extranets.
- Reduces the costs of customer service, phone calls and faxes.
- Reduces inventory, procurement and training costs to the organisation (Burn 2007).

The benefits of e-business through the Internet, intranets and extranets may be classified under five headings: enhanced communication, productivity enhancements, business enhancements, and cost reduction and information delivery. In doing a strategic analysis for e-business solutions, technology leadership is imperative for achievement of results. Plant (2000) identifies seven dimensions of an e-business strategy: three bonding factors— namely, leadership, infrastructure and organisational learning and four positional factors, technology, branding, service and market. He also stated that the keys to successful development of e-business strategy are;

- developing a strategy before developing a web presence;
- developing a strategy by focusing on technology, branding, service and market;
- development of an IT infrastructure capable of matching the strategic objectives;
- identifying and using knowledge in the organisation;
- focusing on added value for customers;
- continually evolving these strategies and having a senior executive as project champion (Plant 2000).

1.2 Statement of the Problem

Most of the transactions and activities of Ho Polytechnic like the advertisement of programmes, sale of admission forms, issuing of admission letters to students, billing of students, payment of fees, registration of programmes and courses, staff performance appraisal, procurement of equipment, and other logistics are manually done at great cost to the Polytechnic. These manual transactions are labour intensive, time consuming, stressful, and very expensive and involve the use of much paper. This situation has been aggravated by the following challenges and constraints;

- increasing number of qualified applicants the Polytechnic has had to admit,
- dwindling government subvention to polytechnics in Ghana over the years,
- rising cost of education delivery using traditional methods;
- inadequate academic and physical facilities
- low morale among staff as a result of poor conditions of service (Ho Polytechnic 2002).

The application of e-business to the activities in the value chain of the Polytechnic is expected to help reduce cost of education delivery. The core businesses of the Polytechnic are teaching and learning, research and community service. Teaching and learning as core activities of the Polytechnic involve, registration of students, teaching, practical training and industrial attachment, setting of examinations, moderation of question papers, conduct of examinations, assessments of students and grading, as well as consideration and publication of results. At the moment, most of these activities are carried out manually, without a resort to e-business or the use of ICT.

The supporting activities like advertising of programmes, issuing of identification cards to students, matriculation and congregation of students, billing of students and arrangements for the collection of monies by the Finance Office, orientation of students on the use of the Library by the Librarian, maintenance of institutional physical and academic facilities by the Estate Department, orientation of students on the rules and regulations of the institution by the Office of the Dean of Students among others are also manually accomplished by the Polytechnic in this age of ICT.

1.3 Objectives of the Study

The general objective of the study is to assess the prospects of applying e-business to the core activities of Ho Polytechnic in order to help the institution reduce cost, maximise productivity and improve efficiency in the management and delivery of educational programmes.

The specific objectives of the study are:

- To examine the challenges and constraints facing Ho Polytechnic in performing its value chain activities.
- To assess efforts being made to address the challenges and constraints.
- To assess the possibility and benefits of applying e-business to the value chain activities of Ho Polytechnic.
- To recommend the application of e-business to the value chain activities of the Polytechnic as a means of reducing cost, maximising productivity and improving efficiency of the delivery of educational programmes.

1.4 Research Questions

The main research question is ‘Can e-business be applied to the activities in the value chain of the Polytechnic to help reduce cost, maximise productivity and improve efficiency?’

The research questions of this study are therefore:

- What are the challenges and constraints facing the Polytechnic in performing its value chain activities in the education delivery process?
- What efforts are being made to address these challenges and constraints?
- What are the benefits of applying e-business to the value chain activities of the Polytechnic?

- Can e-business be applied to the value chain activities of educational programmes at Ho Polytechnic to reduce cost, improve efficiency and maximise productivity?

1.5 Hypothesis

The study hypothesizes that 'if e-business is applied to the value chain of the educational programmes of Ho Polytechnic, then the cost of operations would reduce, efficiency would improve and productivity would be maximised.

1.6 Significance of the Study

This pioneering study would reveal the comparative advantage of applying e-business to the core activities of the Polytechnic as opposed to the manual management of educational programmes in an age of ICT. The recommendations for the application of e-Business would help reduce cost, maximise productivity and improve efficiency. Secondly, the findings would serve as reference material for policy makers in the educational sector on the application of e-business to the management of educational programmes to reduce cost. The research report would also serve as a contribution to knowledge on the application of e-business to value chain activities of educational programmes. Finally, the study would serve as the basis for the adoption of a radical e-Business strategy in the management of educational programmes at Ho Polytechnic.

1.7 Overview of Research Methodology

The research methodology of the study considered the population of the study area, sampling procedures and techniques, sources of data, instruments of data collection, and presentation and analysis of data. Ho Polytechnic is the study area and it is made up of total staff strength of about 325. The sample population was limited to Senior Members, Senior

Staff and Junior Staff of about of 200. The sample size was 100 respondents, representing 50% of the relevant population.

The two main types of sampling techniques used were probability sampling and non-probability sampling. The study employed simple random sampling to select staff on whom questionnaires were administered in the various departments, but adopted quota and purposive sampling to select staff for interviewing at the Computer Centre and staff in Administration.

The main instruments of data collection used were interviews, personal observation and questionnaire. Three research assistants were trained in interviewing skills, note-taking and documentation skills, to assist in the study. Views were collected and collated using various data collection techniques and analysed from both quantitative and qualitative perspectives.

1.8 Limitations of the Study

This study is not without limitation. The main limitation of this research was the inability of the study to cover the cost of establishing the needed infrastructure, that would have enabled the Polytechnic to take a decision on how readily and practically it could embark on the application of e-business to her educational programmes. Ideally, there should have been an evaluation of the appropriate technological infrastructure for e-Business and its cost. This would have provided an opportunity for a review of the cost against the benefits. A research into the type, methods and cost of an e-business venture could be an area of further academic inquiry for interested scholars in the domain of management information system in future. This limitation is due to time and cost considerations. This limitation, notwithstanding, the findings of this study are expected to stir the imagination of the

management of tertiary education institutions in Ghana on the need for applying e-business to their activities to reduce cost, maximise productivity and improve efficiency.

1.9 Organisation of the Study

The study is presented in five chapters. Chapter one deals with the theoretical framework of the study, comprising a statement of the research problem; objectives of the study; hypothesis underlying the study; significance and limitations of the study. Chapter two is devoted to the review of literature most relevant to the study. Chapter three looks at the methodology and scope of the study in greater detail, whilst chapter four concentrates on the presentation and analysis of data collected from the field work. Chapter five is a summary of findings, conclusion and recommendations of the study.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter deals with a review of literature most relevant to the study. The review concentrates on the concepts of value chain analysis and e-business. It defines the two concepts, traces their origins, development and their application to educational programmes, and discusses the actual and potential benefits of the application of value chain analysis and e-business to educational programmes.

The review also examines the challenges faced in the implementation of e-business ventures by other institutions that have grappled with the concept and provides a conceptual framework for understanding value chain analysis and e-business application to educational programmes. The key concepts reviewed are; value chain analysis, e-Business, competitive advantage, cost leadership, differentiation and focus within an academic institutions and in business enterprises. The review concludes that the application of value chain analysis and e-business to educational programmes at Ho Polytechnic would radically reduce cost, maximise productivity, improve efficiency and achieve a competitive advantage in the training of middle level man power for national development.

2.2 The Concept of Value Chain and Value Chain Analysis

In 1985, Professor Michael Porter of Harvard Business School introduced the concept of the 'value chain' in his book *Competitive Advantage: Creating and Sustaining Superior Performance*. The focus of Porter's argument is that getting competitive advantage by charging less or by having distinctive features should be understood and planned for through the total activities that a company performs (Kaplan & Norton 1992). By splitting these

activities into 'strategically relevant' groups, managers should be able to understand the behaviour of costs as well as work out potential sources of differentiation (Burn 2007).

Value, as a concept, has been defined as 'the amount buyers are willing to pay' for a product or a service (Burn 2007). The value chain analysis, in the opinion of Shank & Govindarajan (1993) is the breaking down of business functions or production processes into separate and strategically relevant activities for purposes of understanding the behaviour of cost and the sources of differentiation of these activities. For example, human resource could be divided into recruitment, training, development, compensation and personnel. The value chain is a series of interdependent and interconnected activities in the process of production of value (Shank & Govindarajan 1993).

According to Kaplan & Norton (1992) general value chain of any organisation may be described in terms of three main elements- its primary activities, its support activities and the margin or the profit it makes. Value chain analysis they stated is used to identify potential sources of economic advantage. Kaplan & Norton (1992) pointed out that value chain analysis determines how the firm's own value chain interacts with the value chains of suppliers, customers and competitors. Companies, they noted, gain competitive advantage by performing some or all of these activities at lower cost or with greater differentiation than their competitors.

Primary activities, Porter noted, are responsible for the creation of the product, its sale and transfer to buyers and the offer of after-sales service. Porter (1980) listed primary activities as; inbound logistics, operations, outbound logistics, marketing and sales and service. Inbound logistics in his opinion include, warehousing, materials handling and

inventory control. Operations on the other hand, comprise the activities that change inputs into finished products like machining, testing, packaging and the maintenance of equipment. Outbound logistics are the activities that store and distribute products to buyers, e.g., warehousing, delivery fleet operations and order processing. Marketing and sales as indicated by Kaplan & Norton (1992) are the activities that provide the means for the buyer to purchase, e.g., advertising, sales force operations, selection and management of distribution channels.

Support activities in value chain analysis, as stated by Kaplan & Norton (1992) are the activities that support the primary activities and each other. Three of these activities they pointed out, are procurement, technology development and human resource management. These support activities can be associated with specific primary activities, while the fourth, business infrastructure, supports the entire chain. Support activities comprise procurement of raw materials. Procurement is usually concentrated in a purchasing department; other purchasing activities are often dispersed throughout a firm (Kaplan & Norton 1992).

Olhager et al (2006) have pointed out that companies are struggling to improve not only their manufacturing operations but also their value chain operations, recognising the increasing importance of finding the best processes and value chain for their products. Consequently, the individual manufacturing company needs tools to match the value chain to their products lines. A value chain encompasses all value adding activities in providing products to the customer, including overhead activities required to manage the operations.

The costs and value drivers are identified for each value activity. The value chain framework quickly made its way to the forefront of management thought as a powerful

analysis tool for strategic planning. Its ultimate goal is to maximize value creation while minimizing costs. The concept has been extended beyond individual organizations. It can apply to whole supply chains and distribution networks. The delivery of a mix of products and services to the end customer, will mobilize different economic factors, each managing its own value chain (Olhager et al 2006).

The industry wide synchronized interactions of those local value chains create an extended value chain, sometimes global in extent. Porter terms this larger interconnected system of value chains the "value system." A value system includes the value chains of a firm's supplier (and their suppliers all the way back), the firm's itself, the firm distribution channels, and the firm's buyers (Olhager et al 2006).

Capturing the value generated along the chain is the new approach taken by many management strategists. For example, a manufacturer might require its parts suppliers to be located nearby its assembly plant to minimize the cost of transportation. By exploiting the upstream and downstream information flowing along the value chain, the firms may try to bypass the intermediaries creating new business models, or in other ways create improvements in its value system (Olhager et al 2006).

Technology development includes engineering and process development and, while usually associated with an engineering or development function, may also include office automation and telecommunications. Human resource management as a support activity according to Moran (1998) includes recruitment, hiring, training, development and compensation of personnel. As a support activity, human resource management is partly centralised but it is increasingly becoming decentralised in recent times. Porter points out that the skills and motivation of employees and the costs involved may be critical to

competitive advantage. Moran (1998) stated a firm's infrastructure broadly encompasses general management activities, as well as finance, accounting, legal, corporate affairs and quality management. Often viewed as an overhead, these can be a considerable source of advantage (Moran 1998).

To perform value chain analysis, Burn (2007) revealed a firm is divided into its key activities and costs assigned to those activities. For each activity, she stated, you need to understand the cost drivers, the linkages between activities and the company's cost position relative to other competitors. Linkages to the buyers' and suppliers' value chain are identified and potential sources of differentiation assessed. A differentiation strategy, according to her, is developed to maximise value to the buyer and minimise an increase in cost to the producer of the product or service (Burn 2007).

2.3 The Concept of E-Business

Electronic Business, commonly referred to as *e-Business* may be defined as the utilisation of information and communication technologies (ICT) in support of all activities of business. Commerce constitutes the exchange of products and services between businesses, groups and individuals and hence can be seen as one of the essential activities of any business. Hence, electronic commerce or e-Commerce focuses on the use of ICT to enable the external activities and relationships of the business with individuals, groups and other businesses (Sébastien 2006).

The emergence of e-business is redefining the way business is conducted. It offers organisations new ways to expand the markets, in which they compete, streamlines their corporate business processes to deliver products and services more efficiently, attracts and

retains customers in new and innovative ways, and reduces costs of operations. E-business is transforming the way customers, employees and suppliers are relating to one another. These changes are forcing organisations to craft new strategies and adopt new methods of implementation (Baghdadi 2006).

E-business can be described as an emerging area that encompasses processes directly and indirectly related to the buying, selling and trading of products and services, and information electronically. Baghdadi (2006) defines e-business based on four perspectives.

These four perspectives are:

- *communication perspective* – e-business is the deliverer of information, products/services or payments over telephone lines, computer networks, or any other electronic means;
- *business process perspective* – e-commerce is the application of technology towards the automation of business transactions and work flows;
- *service perspective*– e-commerce is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery; and
- *online perspective* – e-commerce provides the capacity to buy and sell products and information on the Internet as well as other online services. e-business involves the buying and selling of information, products, and services e-business and business use of the Internet. In the opinion of Baghdadi (2006) it involves all aspects of trading including commercial market creation, ordering, and the transfer of money. Businesses have shown significant interest in using the Internet as a means for

building stronger relationships with customers, suppliers, employees and business partners.

E-business, or business conducted over the Internet, is not limited to buying and selling goods and services but includes many other factors such as the internal functioning of businesses, serving customers and cooperating with both suppliers and partners. Collaborations in e-business go beyond simple communications or transactions (Baghdadi 2006) and the objective of e-business applications is to make businesses agile by supporting dynamic boundary-crossing business processes, whether fixed or flexible, and related to both internal and external business needs.

There are therefore, two fundamental elements to developing a functional e-business application: identifying and defining these types of business processes with both a business-interactions and connection-oriented perspective, which are necessary to dynamically compose them from existing and disparate information systems (i.e., enterprise, partner, supplier, and even customer information systems) and an architecture supported by a standards-based technology platform to make these disparate information systems interoperable, and to leverage and reuse the IT assets (Baghdadi 2006).

An e-marketplace is an essential component of e-business. It is an interorganisational information system that allows the participating buyers and sellers in some market to exchange information about prices and product offerings (Sébastien 2006). An e-marketplace is an information system that allows buyers and sellers to exchange information about prices and product offerings, and the firm operating the e-marketplace acts as an intermediary (Sébastien Tran 2006). This is a place on the Internet, where many business, buyers and suppliers meet, trade and collaborate (Sébastien 2006).

Online business-to-business (B2B) relations have played a key part in the way firms organise their businesses and their relational networks. The main issue has been the emergence of new intermediaries which reorganise business and management process throughout the value chain. E-marketplaces, which are the fora for e-business, are gradually transforming the organisational structure between firms Sébastien (2006).

The spread of Internet and electronic networks has led to changes in business organisation and firms' strategies. The development of e-business is reshaping the dynamics of competition, especially in some industries of which the market structure has changed with the introduction of new types of practices between firms. One of the most important phenomena in economic relations is the appearance of new intermediaries, often called 'infomediaries' (Sébastien (2006) or 'cybermediaries' (Sébastien 2006) in the academic literature. These new agents are the e-marketplaces in business-to-business (B2B) commerce, which offer different services for each variety of business situations between buyers and sellers, from market mechanisms to the integration of business process across the supply chain. They are supposed to facilitate the different dimensions of business-to-business relations. Firms can select the most efficient electronic mechanism for their exchanges with buyers and sellers (Sébastien 2006).

E-business in the opinion of Ariguzo et al (2006) poses minimal entry barriers. E-business is significantly reshaping manufacturing organisations. It is changing manufacturing systems from mass production to demand-driven, possibly customised just-in-time manufacturing systems. Strategic flexibility enables an organisation to provide

customers with personalised products while retaining the economic advantages of mass production Ariguzo et al (2006).

E-business provides manufacturers with a great opportunity to sell and distribute directly to final customers. E-business also improves the flow of organisational information. It is especially useful in gathering intelligence on customers, competitors, and potential markets. E-business increases an organisation's ability to sense and respond to the market needs by collecting and disseminating market information throughout the organisation. With this information, the organisation could accurately assess or stimulate market demand and search for new markets Ariguzo et al (2006).

The electronic medium associated with e-business has the potential of increasing the speed in service delivery and communication. E-business enables organisations to shorten procurement cycles, reduce development cycles, and accelerate time to market through collaborative engineering, product and process design. This dramatically reduces purchasing, production, and cycle time. E-business allows organisations to quickly respond to customer needs through reduction of the time to market, the time to produce, the time to deliver, and the time to service e-business offers numerous organisational benefits including reduced costs and improved customer service. The capabilities and opportunities afforded by an internet-based e-marketplace significantly improve the productivity and competitiveness of participating e-business-based organisations (Ariguzo et al 2006).

Ariguro et al (2006) indicated that these challenges are more organisational in nature as opposed to being technology related. In this context, a well-structured business strategy is the backbone of organisational effectiveness regardless of the chosen business model.

Therefore organisations that integrate e-business models with their strategic orientation are more likely to have successful e-business efforts. Successful e-business strategies emphasise the importance of organisational innovation and willingness to change.

To implement e-business solutions, Ariguro et al (2006) have stated that, it is necessary to have supporting information, and organisational infrastructure and systems. In this context, organisational infrastructure needs to be designed with sufficient flexibility to allow for adaptive change. Another challenge to effective e-commerce implementation is the shortage of people with the necessary information technology skills. Consumers' fear of a security breach represents another serious challenge to e-business implementation. Some organisations are still hesitant to transmit confidential information over the Internet because of legal and privacy concerns (Ariguzo et al 2006). Ariguzo et al (2006) have highlighted four possible sources of competitive advantage that may accrue through the use of business-to-business (B2B) e-commerce:

- lower wholesale and intermediation costs,
- lower purchasing costs due to realised supply and logistic efficiencies,
- improved information access, gathering, and processing associated with supply chain management, and
- improved market share or development of new markets resulting from lower marketing information costs.

E-business depends on the use of web technology tools like the -Internet, Extranet the Intranet and a Local Area Network (LAN) system to carry out business transactions like; advertising, promotion of products, sending and receiving purchase requests, invoices,

inventory control, billing of retailers and electronic payments. E-business is a paperless transaction, meant to save cost and put an organisation at a competitive advantage (Burn 2007). Much expenditure is incurred by most organisations on the creation, handling and storage of paper documents in the form of proposals, purchase orders, shipping documents, invoices, approvals for payment and cheques among others. Tertiary institutions in Ghana are no exception to this problem.

The potential advantage in the deployment and exploitation of e-business in the delivery of educational programmes, in order to reduce cost, maximise productivity and improve efficiency is the subject matter of this research.

2.4 Benefits Associated with an E-Business Venture

In making the case for e-business the real and potential competitive advantages in terms of cost reduction, maximization of productivity and the improvement of efficiency are paramount. The following are the real and potential benefits associated with the deployment and exploitation of an e-business venture;

- ability to introduce your organisation and staff to the wider world by displaying resumes and pictures on the Internet,
- strengthening relationships and the ability to market additional services to existing clients,
- availability of information twenty-four hours per day at minimum cost and with minimum resources,
- interactive communications with clients,
- strengthening of recruitment processes. (www.thewebseye.com)

- reduction in the cost of paper,
- elimination of private network charges,
- process efficiency through work flow redesign,
- outsourcing of functions and linkages to customers and suppliers through collaborative extranets,
- reduction in the cost of customer service, phone and fax,
- reduction in inventory, procurement and training costs to the organisation (Burn 2007).

The benefits of e-business from the Internet, intranets and extranets may be classified under five headings: enhanced communication, productivity enhancements, business enhancements, and cost reduction and information delivery. In doing a strategic analysis for e-business solutions, technology leadership is imperative for achievement of results. Plant (2000) identifies seven dimensions of an e-business strategy: three bonding factors—leadership, infrastructure and organisational learning and four positional factors, technology, branding, service and market. He also emphasises that the keys to successful development of e-business strategies are;

- developing a strategy before developing a web presence,
- developing a strategy by focusing on technology, branding, service and market,
- developing an IT infrastructure capable of matching the strategic objectives,
- identifying and using knowledge in the organisation,
- focusing on added value for customers,
- continually evolving these strategies and having a senior executive as project champion (Plant 2000).

The latter half of the 1990s (Rajan 2006) saw the emergence of countless dot.com companies, all lured by the belief or promise of attainment of great wealth in minimal time. Barring a few success stories, for the vast majority of these aspiring e-commerce entrepreneurs, this turned out to be a mirage and many came to a shattering crash. In almost all these cases, the human element and an understanding of existing and potential customers were accorded minimal importance.

2.5 Getting Strategic Advantage in a Competitive e-Business Environment

An important way of getting strategic advantage in a competitive business environment, Kaplan & Norton (1992) noted, is through leveraging the organisation through ICT and e-business. E-business, they contended, is fundamental to business strategy and process execution. Typically an organisation will look to ICT to enhance selling or buying channels. Those that engage primarily in business to customer (B2C) commerce give priority to their sell side to generate increased revenue, better manage customer relationships and reduce costs. This is especially true of the dot-com companies that typically have negligible supply chains and that are driven by a need to gain market shares rapidly. Companies that engage primarily in business to business (B2B) commerce tend to give priority to reducing the costs of selling, buying, or both in the opinion of Kaplan & Norton (1992).

2.6 Strategies for Developing an Institutional Website

Strategy has been defined by Kaplan & Norton (1992) as *"the art and science of formulating, implementing, and evaluating cross functional decisions that enable an organisation to achieve its objective"* (Kaplan & Norton 1992). Web design strategy Kaplan & Norton (1992) point out is the process by which to optimise your website to take advantage of the opportunities in the external environment, whilst addressing the threats that

are likely to impact on it. Formulating a website design strategy is very important to the success of any e-business strategy. According to Kaplan & Norton (1992) certain critical questions need to be answered in the process of getting a website designed. Firstly, what is the purpose of your site? Is it a marketing tool, a shopping cart to enable online sales, or both? What are your objectives? Secondly, what are the strengths and weaknesses of the organisation? Thirdly, how is income going to be generated from the deployment of e-business through a website? Will it be from advertising, from site membership fees, from affiliate programmes, or from selling your own products? What are your capabilities and how will you use them to maintain a competitive advantage over your rivals? Answers to these questions, in the opinion of Pister (1999) will determine the framework for formulation of an e-business strategy which will in turn have implications for all other aspects of the website design.

2.7 Designing a Website: Steps and Purpose

Pister (1999) prescribes five easy steps to be taken in the design of a website. In his opinion, there is a compelling need to;

- get a domain name,
- find a web host,
- get website software,
- design a web page and upload a web page or use a website host template as part of the hosting package.

Most sites, Pister (1999) stated, are either informational or e-commerce sites. Informational sites, he said, usually make their income from membership fees, advertising,

commissions, or selling at the back end. E-business sites, on the other hand, usually make their income by selling a product or service. According to Pister (1999) it is often difficult to combine both into the same website because an informational site needs to provide unbiased information about the topic of the website, while an e-business site needs to generate sales and use direct marketing tactics.

Objectives in the design of a website, in the opinion of Pister (1999), must be clear, focused and specific, measurable, feasible and suitable for the industry you are focusing on. Even more important he pointed out, is the content strategy because you need to provide content that is likely to be targeted at your visitors. Commenting on aesthetics and layout of websites, Pister (1999), states that the site should be informative and appealing to visitors and patrons. An attractive site, he believed might be of some interest to viewers and compel them to want to see more. The layout, he contented, should be designed so that the viewer can quickly and easily understand the site's mission.

Contributing to the debate on website creativity, Lorenzo (2003) stated that a site should be creative enough to appeal to the target website visitors and must be enhanced with forms, bulletin boards, search software, helpful links, foreign language areas, download/upload features and more. Well-designed feedback forms, he pointed out would assist the user in formulating meaningful information (Lorenzo 2003).

Ease of navigation, in the opinion of Lorenzo (2003), is crucial and critical to the success of every any website. The navigational structures, Lorenzo (2003) noted, must be designed with the content and the intended audience in mind. According to Lorenzo (2003) viewers would be able to navigate with considerable ease to a desired location within two or three clicks if navigational structures are well thought out and properly constructed. Lorenzo

(2003) prescribed the use of feedback forms for visitors to comment on the effectiveness and patronage of the website and how they can be made more user-friendly.

2.8 Challenges and Constraints of Polytechnics as a Tertiary Institution

Tertiary education in Ghana encompasses the universities, university colleges, the polytechnics, theological and tutorial colleges. Tertiary education plays a vital role in the socio-economic development of the nation, including the creation, dissemination and application of knowledge, as well as the adaptation of knowledge for meeting national development needs and aspirations (Republic of Ghana 2002).

After their upgrading in 1992 to tertiary status, the polytechnics in Ghana were confronted with the challenge of managing the change of the existing polytechnics, from Ghana Education Service (GES) second cycle institutions, to reputable diploma awarding tertiary institutions, in an atmosphere of uncertainty and instability. Managing this change to achieve the strategic objectives of the polytechnics has been a major headache for all stakeholders, particularly the councils and management of the polytechnics.

The polytechnics in Ghana were upgraded to tertiary status in 1993 with the promulgation of the Polytechnic Law, PNDC Law 321, 1992. They were charged with responsibility for producing middle level manpower in manufacturing, applied science and technology and business and commerce for national development. The polytechnics are also to encourage the study of technical subjects at the tertiary level and provide opportunity for research and publication of research findings (Polytechnic Law 1992).

The polytechnics started in most cases with staff of the Ghana Education Service (GES), who after some screening exercise, opted to stay. The role the polytechnics were expected to play was not clarified nor were the needed structures put in place before their upgrading. The polytechnics were therefore confronted at birth with problems of lack of qualified staff, inadequate classroom and staff accommodation facilities, equipment for their workshops and laboratories, the absence of conditions of service for staff, inability to attract and retain qualified staff because of the poor conditions of service and the generally low morale associated with working in the polytechnics (NCTE 2001: 14).

The polytechnic environment in the first 10 years of their existence was characterised by instability on both student and staff fronts. Students embarked on several boycotts of lectures in support of their demand for job placement, academic progress, cost sharing with government and opposition to the new grading system for the polytechnics. The staff also declared numerous strike actions to demand improved conditions of service, promotion criteria and book and research allowances among other grievances. This situation of persistent strikes and boycotts has created a public impression of the polytechnics as strike-mongers (NCTE 2001: 15).

The situation compelled the National Council for tertiary Education, to set up the Technical Committee on Polytechnic Education, chaired by Prof. F O Kwami, to assess the role of polytechnics in national development; review the progress made since they were upgraded to tertiary status in 1993; determine the relationship that should exist between the universities and the polytechnics; determine the kind of collaboration that should exist between the polytechnics and industry and to recommend appropriate scheme and conditions of service for the polytechnics (NCTE 2001:3).

The Kwami Report is a very excellent blue-print for vocational/technological education in Ghana. The Report among other things recommended that:

- Government should ensure that academic and physical infrastructure in the polytechnics are expanded and improved to enable them discharge the roles for which they have been set up.
- Polytechnics should take advantage of postgraduate training under the GETFund to pursue vigorous staff development policy.
- Polytechnics should rationalise their programmes based on their academic capacity, emerging markets and the environment in which they are located to make their programmes relevant.
- Polytechnics should forge formal mutually beneficial links with industry, universities and research institutions to support their programmes.
- Teaching staff who qualify in terms of the proposed scheme of service should enjoy the same basic salary as staff of equivalent status in the universities to enable the polytechnics attract and retain high calibre of staff (NCTE 2001:3).

Even though some of its recommendations have been implemented, no white paper has come out on the Kwami Report for implementation. This lack of political will, on the part of Government, to implement the Kwami Report, is adversely affecting Ghana's capacity to conclusively produce the requisite calibre of human capital most relevant to national development aspirations, beyond what the universities in their constraints are producing.

Afeti (2004) has identified certain additional barriers to change in the polytechnics namely; the absence of a shared institutional vision, absence of a goal setting culture, fear of causing disaffection, the weight of tradition and lack of exposure or limited knowledge of innovative practices in tertiary education by the management team. In the opinion of Nsiah-Gyabaah (2008:11) the polytechnics can overcome some of their current difficulties by the adoption of certain strategies; namely, strategy to link the polytechnics and industry, strategy to improve the relevance of polytechnic to the needs of industry, strategy to generate internal sources of income for polytechnic graduates, strategy to promote private sector participation in the economy and strategy to improve the employment opportunities of polytechnic graduates.

The Technical Report (2001), (Professor Kwami Report) is silent on what role ICT should play. Neither Afeti (2004) nor Nsiah-Gyabaah (2008) was explicit on what role ICT should play in building capacity for the polytechnics to enable them play their expected roles more meaningfully. If the recommendations of the Professor Kwami Report (2001), the difficulties outlined by Afeti (2004) and the strategies mapped out by Nsiah-Gyabaah (2008) for overcoming the challenges confronting the polytechnics are to materialise successfully, then the application of value chain analysis and e-business to the activities of the polytechnics in Ghana, through the deployment and exploitation of ICT must be given serious attention.

The Technical Report Series of the National Council of Tertiary Education (2002:27) which dealt with the expenditure and revenue analysis of tertiary education in Ghana, observed that, in the universities and polytechnics, the proportion of personal emoluments has been falling. It was therefore expected that the management of these institutions would

become aware of the need to save funds by reducing the cost of most of their value chain activities through the application of e-business. The Technical Report Series (2002:27) proposed the following measures for achieving reduction in expenditure:

- Reducing the incidence of overtime work by strengthening supervision,
- Using machines more in the mechanical activities, for example, keeping of the vast grounds and lawns of the institutions,
- Outsourcing some of the support services in the value chain of the institutions that require the employment of large numbers of staff,
- Restricting employment of extra staff to only critical areas, and.
- Exercising strict control over the processing of the payroll to prevent abuses as the incidence of ‘ghost’ workers.

With respect to the financial management of tertiary institutions, the Technical Report Series of the National Council of Tertiary Education (2002:28) noted that record keeping and financial reporting for decision-making from 1996-2000 were not adequately or fully informed. The Report observed that managers in the faculties and departments were not adequately involved in the financial management of the institutions. This situation was aggravated by non-prevalence of the use of computers in recording financial data. The Report recommended re-training of staff in management accounting skills as pertained to tertiary education, and in financial management, the use of computers and the appropriate accounting and financial management applications, as well as the active involvement of faculty in financial management for purposes of transparency. These observations about the operations of tertiary institutions make the case for value chain analysis and the application

of e-business to their activities more imperative than ever before in the history of tertiary education.

Ho Polytechnic, like all other tertiary institutions in Ghana, is confronted with a bewildering diversity of challenges. These challenges include;

- increasing number of qualified applicants and the inability of the Polytechnic to admit all of them;
- dwindling government subvention for polytechnics in Ghana over the years,
- rising cost of education delivery using traditional methods;
- inadequate academic and physical facilities
- low morale among staff as a result of poor conditions of service;

The challenges facing the Polytechnic could be turned into opportunities through the use of ICT and the application of e-business strategy to educational programmes in order to reach out to more students at a competitive cost. There is an appreciable level of computerisation at Ho Polytechnic. For example, functional areas like the administration, finance registry, academic departments, have computers that are used to collect, process, retrieve and store information necessary for running the institution. However the present networking does not allow for sharing of information electronically. Most of the transactions and activities of the Polytechnic like the packaging and delivery of core activities to students and the general public are manually done.

For example, the advertisement of programmes, sale of admission forms, issuing of admission letters to students, billing of students, payment of fees, registration of courses, staff appraisal, procurement of equipment, and other logistics are manually done at great cost to the Polytechnic. These manual transactions are labour intensive, time consuming,

stressful, less accurate, and very expensive and involve the use of much paper. This situation does not put the institution at a competitive advantage in the business of education delivery for national development.

2.9 An overview of the ICT Scenario at Ho Polytechnic

Ho Polytechnic is a tertiary educational institution in Ghana. Tertiary education plays a vital role in the socio-economic development of the nation, including the creation, dissemination and application of knowledge, as well as the adaptation of knowledge to meet local needs and aspirations. The Ho Polytechnic was established as a Technical Institute in 1968, redesignated a Polytechnic in 1985 and upgraded to tertiary status in 1993 with the promulgation of the Polytechnic Law, PNDC Law 321, 1992. It was charged with responsibility for producing middle level manpower in manufacturing, applied science and technology and business and commerce for national development. The Polytechnic has mandate to encourage the study of technical subjects at the tertiary level and provide opportunity for research and publication of research findings.

The primary (core) activities of Ho Polytechnic are teaching and learning, research and community service. The support activities of the Polytechnic are human resource management, finance, registry, procurement, estates, and students' support services. The primary activities of the Polytechnic may further be divided into; Inbound Logistics, Operations, Marketing and sales, and Service. The Inbound Logistics of the Polytechnic include; reference materials, knowledge management and academic programmes. Operations value chain includes, course instructional design, course content, students hand books, student manuals and notices. The Outbound value chain includes packaging and storage of course materials. Delivery and Sales aspect involves; calendar of academic work,

teaching and learning outcomes, fees, advertisement of courses and programmes, and industrial attachment. Service as a primary activity involves, coaching, mentoring, assessment and examination, students support services, technical support, tutorials, guidance and counseling.

KNUST



CHAPTER THREE

METHODOLOGY AND SCOPE

3.1 Introduction

The main issues considered under methodology of the study are, description of the population and the study area, sampling procedures and techniques, sources of data, instruments of data collection, fieldwork, presentation and analysis of data.

3.2 Background of the Case Study

Ho Polytechnic is the study area of the research. The Polytechnic has a vision of becoming; ‘A reputable technological institution contributing to national development by providing career-focused education and skills training to the highest level possible and exploiting opportunities for conducting practical research in close collaboration with business and industry’. In the mission statement that guides its operations as a tertiary institution, the Polytechnic is to:

- Maintain a conducive teaching and learning environment to promote the training of highly skilled and competent manpower imbued with entrepreneurial skills in partnership with industry;
- Provide opportunities for and conduct practical research to advance economic growth;
- Provide expert services to satisfy societal needs;
- Pursue a diversification of funding sources to support institutional activities (Ho Polytechnic 2002).

The Polytechnic was established in 1968 to provide pre-technical training courses in various engineering and building trades. In 1972, the pre-technical courses were up graded to more advanced programmes in technical, business and other vocational disciplines. Though the Technical Institute was re-designated a Polytechnic in 1986, it was not until 1993 that it had

the full backing of the Law (PNDC Law 321) to become a tertiary institution with statutory objectives and functions. Currently, Ho Polytechnic offers at the tertiary level Higher National Diploma (HND) programmes in the following disciplines; Automobile Engineering, Agricultural Engineering, Electrical Electronic Engineering, Building Technology, Statistics, Hotel, Catering & Institutional management, Accountancy, Secretaryship and management studies, Marketing, Fashion Design & Modeling.

The Polytechnic also has two servicing Departments the Computer Centre and the Department of Liberal and General Studies. In addition to the above, the institution also offers some non-tertiary programmes. Such as Advanced Fashion and cookery part 1 & 2. The Polytechnic has also been granted accreditation to run two B-Tech degree programmes in Automobile Engineering and Hospitality & Tourism Management.

Currently, the Polytechnic offers tertiary programmes at the Higher National Diploma (HND) level in the following disciplines; Automobile Engineering, Agricultural Engineering, Electrical and Electronic Engineering, Building Technology, Statistics, Hotel Catering and Institutional Management, Accountancy, Secretaryship and Management Studies, Marketing and Fashion Design and Modeling.

Some non-tertiary programmes; such as Advanced Fashion and Cookery Part 1 & 2, Construction Technician I & II, and Diploma in Business Studies (DBS) are also being offered. The Institution has also started mounting Bachelor of Technology degree programmes in Automobile Engineering and Hospitality and Tourism Management.

3.3 The Study Population

Ho Polytechnic is made up of total staff strength of about 325. This number is made up of three categories of staff namely senior members, senior staff and junior staff, comprising principal officers of the administration; academic or teaching staff made up of the Deans of Schools, Heads of the Departments and their staff and non teaching staff.

3.4 Sampling Procedures

In order to ensure that the research findings have a strong internal validity the sample size excluded the auxiliary staff of about 125 whose views on the application of e-business to value chain might not be very useful. The sample population was therefore limited to the Senior Members, Senior Staff and Junior Staff of about of 200. The sample size was 100 respondents, representing 50% of the total population made up of the following category of staff:

3.5 Sampling Schedule

No	Category of Staff	Population	Sample Size	Percentage
1	Academic/Teaching Staff	125	70	60
2	Mgt/Administrative Staff	75	30	40
3	Total	200	100	100

3.6 Sampling Techniques

Sampling is the process of examining a representative number of people or things out of a whole population. The data was collected from a cross section or sample that represents the rest of the population. There are two main types of sampling techniques, namely; probability

sampling and non-probability sampling. In probability sampling, each and every unit within the population had an equal chance of being selected.

The various types of probability sampling include; simple random sampling, stratified sampling, systematic sampling and cluster sampling. This study employed the simple random sampling to select staff on whom questionnaires were administered in the various departments. In non-probability sampling, the selected sample is not representative of the population because the units in the population are not given equal chances of being included in the sample. Examples of non-probability sampling include; quota sampling, accidental sampling and purposive sampling. The study adopted quota and purposive sampling to select staff for interviewing and administering of questionnaire from the Computer Centre and staff in administration.

3.7 Sources and Instruments of Data Collection

Secondary Data: Relevant literature on value chain analysis and the application of e-business to educational programmes was reviewed. Materials for review came from sources like books, journals, articles, staff records and the Internet.

Primary Data: The use of questionnaire was the main instrument of gathering primary data. The researcher employed mainly closed questions to facilitate analysis of data and provided a few open ended questions as an opportunity for respondents to freely express their opinions and ideas on the issues under investigation.

Interviewing: Personal interviews were conducted with people who were entrusted with the responsibility of providing and maintaining the ICT systems of the Polytechnic as well as people who were privileged to have access to any of these facilities.

Observation: Non participant observation was used to enable the researcher to obtain more information on the behaviour of staff of the Polytechnic in connection with the research.

3.8 The Fieldwork

Three research assistants were trained to assist in data collection. The fieldwork took one month to complete. After the design of the questionnaire it was test run. Problems detected during the test run were used to fine tune the final questionnaire. The field assistants were also trained in interviewing skills, note-taking and documentation skills, to ensure that they understood the questions. Questionnaires were then administered with the help of the three research assistants.

3.9 Data Processing and Analysis

The views collected and collated using various data collection techniques and analysed from both quantitative and qualitative perspectives. Statistical tools like bar and pie charts, frequency distribution tables and graphical presentation were used in analyzing the questionnaire while the responses from interview and the results of the observation made were presented in qualitative form.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

This chapter is a presentation and analysis of data and it seeks to address the questions raised in the statement of the problem, namely:

- What are the challenges and constraints facing the Polytechnic in performing its value chain activities in the education delivery process?
- What are the benefits of applying e-business to the value chain activities of the Polytechnic?
- What efforts are being made to address these challenges and constraints?
- Can e-business be applied to the value chain activities of educational programmes at Ho Polytechnic to reduce cost, improve efficiency and maximise productivity?

4.2 Personal Data of Respondents

Gender of Respondents: The sample size of the study is 100 respondents comprising 70 academic staff and 30 management staff. Out of the 100 respondents, seventy-six percent (76 %) are male whilst 24% are female as indicated in Table 4.1.

Table 4.1 Gender of Respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	76	76.0	76.0	76.0
Female	24	24.0	24.0	100.0
Total	100	100.0	100.0	

Sources: Field Data April 2009.

On the classification of age group, it was realised that 54% of respondents were below 40 years, 15% were in their 50s, whilst two percent were above 60 years and were on contract

teaching appointment within specific departments in the Polytechnic. Twenty-nine percent (29 %) of the respondents were in their 40s as indicated in Table 4.2.

Table 4.2 Age Group of Respondents

Age Group	Frequency	Percent	Valid Percent	Cumulative Percent
20-29	23	23.0	23.0	23.0
30-39	31	31.0	31.0	54.0
40-49	29	29.0	29.0	83.0
50-59	15	15.0	15.0	98.0
Above 60	2	2.0	2.0	100.0
Total	100	100.0	100.0	

Sources: Field Data April 2009.

With respect to the level of education, first degree and HND holders constituted a majority of 67.7 %, whilst first degree holders comprised 34.4 % of the respondents, HND holders constituted 33.3 % of the respondents. Masters degree holders formed 30.1 % of the respondents whilst, PhD holders constituted only 2.2 % as stated in Table 4.3.

Table 4.3 Level of Education of Respondents

Level of Education	Frequency	Percent	Valid Percent	Cumulative Percent
HND	31	31.0	33.3	33.3
First Degree	32	32.0	34.4	67.7
Masters	28	28.0	30.1	97.8
PhD	2	2.0	2.2	100.0
Total	93	93.0	100.0	
System	7	7.0		
Total	100.0			

Sources: Field Data April 2009.

With regard to length of service within Ho Polytechnic, 79.8 % of respondents had been in the service of the institution from one year to 10 years, whilst seven point one percent had served the Polytechnic for more than 20 years. Those who had served the

Polytechnic for 11 to 15 years constituted 11.1 %, whilst those who had served for 16 to 20 years were only two percent of the respondents as outlined in Table 4.4.

Table 4.4 Length of Service of Respondents at Ho Polytechnic

Duration of Service		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5yrs	44	44.0	44.4	44.4
	6-10yrs	35	35.0	35.4	79.8
	11-15yrs	11	11.0	11.1	90.9
	16-20yrs	2	2.0	2.0	92.9
	above 20yrs	7	7.0	7.1	100.0
	Total	99	99.0	100.0	
Missing System		1	1.0		
Total		100	100.0		

Sources: Field Data April 2009.

4.3 Challenges and Constraints facing Ho Polytechnic in performing its Value

Chain Activities

As earlier stated in the description of the study area; Ho Polytechnic has a vision of being: ‘A reputable technological institution contributing actively to national development by providing career-focused education and skills training to the highest level possible and exploiting opportunities for conducting practical research in close collaboration with industry’(Ho Polytechnic 2002). In the mission statement that guides its operations as a tertiary institution, the Polytechnic is to:

- Maintain a conducive teaching and learning environment to promote the training of highly skilled and competent manpower imbued with entrepreneurial skills in partnership with industry;
- Provide opportunities for and conduct practical research to advance economic growth;
- Provide expert services to satisfy societal needs;
- Pursue a diversification of funding sources to support institutional activities (Ho Polytechnic 2002).

In a SWOT analysis of Ho Polytechnic, the strengths of the institution were outlined as the possession of an effective leadership and management; relatively well qualified and dedicated staff; conducive environment for academic work; strong links with the informal sector; good public image and available land for infrastructural development (Ho Polytechnic 2002:2). The SWOT analysis went further to chronicle the weaknesses of the Polytechnic as; inadequate qualified staff; limited classroom and office space; inadequate funding; inadequate accommodation for staff and students; limited teaching and learning facilities (Ho Polytechnic 2002:3).

With respect to the opportunities of the institution; the SWOT analysis identified high demand for technical education and training; potential for collaboration with public and private sectors, NGOs and other institutions; provision of consultancy and outreach services for income generation as its main opportunities. In concluding the SWOT analysis, the Strategic Plan short listed poor conditions of service for staff; low salaries; difficulties in recruitment and retention of qualified staff; inadequate housing facilities; frequent strikes by staff and students; low morale among staff and dwindling funding levels as the main threats confronting the institution in the discharge of its duties and responsibilities (Ho Polytechnic 2002:5).

Apart from the general challenges and constraints noted in the SWOT analysis of the Polytechnic, the institution is confronted with specific challenges and constraints in relation to the application of e-business to the value chain activities of the Polytechnic. These challenges and constraints, according to (Dzisi 2009 & Aboagye 2009), are as follows:

- Unreliable Internet connectivity and very slow functionality of the Internet when it is eventually available
- Inappropriate design of the current Computer Laboratory of the Polytechnic

- Frequent break down of available computers and air-conditioners due to fluctuating and unreliable power supply from the national grid
- Lack of funds to readily repair the computers and air-conditioners when they break down
- Inadequate technical know-how and competence in computer application among staff
- Difficulty in getting specified accessories, parts and equipment due to failure to involve consumer departments in procurement process
- Limited number of computers for staff and students at the Polytechnic to facilitate the deployment of a meaningful e-business venture.

For Ho Polytechnic to be able to apply e-business to the value chain activities of its educational programmes, technical know-how in computer application would be imperative. Data collected from the field revealed that 79.8 % of respondents were either very literate or literate in computer skills. Nineteen point two percent (19.2 %) of respondents rated themselves as moderately literate in computer application as contained in Table 4.5.

Table 4.5 Level of Computer Literacy among Respondents

Level of Computer Lit		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very literate	15	15.0	15.2	15.2
	Literate	64	64.0	64.6	79.8
	Moderately literate	19	19.0	19.2	99.0
	Not literate	1	1.0	1.0	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

Sources: Field Data April 2009.

On the possession of computers either at home or in the office by respondents, 88.9 % of them either possessed computers at home or in their offices at the Polytechnic. Only 11.1 % of respondents did not possess computers at home or in their offices as indicated in Table 4.6.

Table 4.6 Possession of Computers at Home or in the Office by Respondents

Computer Possession	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	88	88.0	88.9	88.9
No	11	11.0	11.1	100.0
Total	99	99.0	100.0	
Missing System	1	1.0		
Total	100	100.0		

Sources: Field Data April 2009.

Table 4.7 Computers Usage among Respondents

No	Responses	Yes %	No %	Total %
1	Research Activities	72	28	100
2	Browsing the Internet	71	29	100
3	Lecture Notes	65	35	100
4	Power Point Presentation	34	66	100
5	Total	242	158	100

Sources: Field Data April 2009.

Seventy-two percent (72 %) of the respondents used their computers for research activities, 71 % used it for browsing the Internet, and 65 % used them for their lecture notes, whilst 34 % of the respondents used their computers for power point presentations as indicated in Table 4.7.

Table 4.8 Networking of Computers in offices for sharing Information

Networked Computers		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	20.0	20.4	20.4
	No	78	78.0	79.6	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

Sources: Field Data April 2009.

A major benefit of communication technology is the sharing of information to facilitate the achievement of organisational objectives. One way of maximising the opportunity for sharing information at the workplace is local area networking of available computers. Unfortunately, 79.6 % of the respondents who possessed computers at the Polytechnic did not have their computers locally networked to facilitate the sharing of information vital to the performance of their duties and responsibilities. Twenty point four percent (20.4 %) of the networked computers were in the Department of Statistics and the Computer Centre of the Polytechnic. This means that with the exception of these two departments, opportunities for sharing information through locally networked computers did not exist at the Polytechnic at the time of this research as indicated in Table 4.8.

Table 4.9 Communication with Students through the E-mail by Respondents

E-mail	Com.	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	22.0	22.2	22.2
	No	77	77.0	77.8	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

Sources: Field Data April 2009.

A critical aspect of communication technology is the sharing of information through various means including the use of the e-mail, to help reduce cost, improve efficiency and maximise productivity in the management of educational programmes. In responding to questions on their correspondence with students through e-mail, 77.8 % of the respondents stated that they did not correspond with students through the e-mail as contained in Table 4.9.

Table 4.10 Issues Communicated to Students through E-mail by Respondents

Issues	Communicated	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Assignments	8	8.0	36.4	36.4
	Lecture Notes	2	2.0	9.1	45.5
	Rescheduling of Lectures	10	10.0	45.5	90.9
	Regulations for Students	2	2.0	9.1	100.0
	Total	22	22.0	100.0	
Missing	System	78	78.0		
Total		100	100.0		

Sources: Field Data April 2009.

Those respondents, who communicated with students through the use of the e-mail, stated that they communicated assignments (36.4 %), lecture notes (9.1 %), and 45.5 % for the

rescheduling of lecture periods. The use of e-mail at the Polytechnic between staff and students was mainly for the rescheduling of lecture periods as pointed out in Table 4.10.

Table 4.11 Communication with Colleagues through e-mail by Respondents

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	59	59.0	59.6	59.6
	No	40	40.0	40.4	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

Sources: Field Data April 2009.

With respect to the use of e-mail in communicating with colleagues, 59.6 % of the respondents used the e-mail whilst 40.4 % of them did not use the e-mail as a means of communication with their colleagues as stated in Table 4.11.

For those who communicated with their colleagues through the use of the e-mail, 47.5 % of the issues were personal, POTAG or management issues constituted 22.0 %, issues concerning the conditions of service constituted 13.6 %, whilst issues of strategies for achieving the objectives of the Polytechnic amounted to 5.1 % as indicated in Table 4. 12.

Table 4.12 Issues Communicated to Colleagues through the E-mail

Issues	Communicated	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Personal issues	28	28.0	47.5	47.5
	POTAG/mgt issues	13	13.0	22.0	69.5
	Condition of service issues	8	8.0	13.6	83.1
	Workload challenges	7	7.0	11.9	94.9
	Strategies for achieving the Polytechnic objectives	3	3.0	5.1	100.0
	Total	59	59.0	100.0	
Missing	System	41	41.0		
Total		100	100.0		

Sources: Field Data April 2009.

On the rating of the competence of respondents on computer applications, 86 % of them rated their competence in word processing as excellent, very good and good, whilst 14 % of them considered their competence in word processing as either fair or poor. With respect to the competence of respondents in spreadsheet, 51.6 % of the respondents rated their competence as fair or poor.

Respondents rated their competence in the use of PowerPoint presentation, for excellent, very good, and good at 62.0 %. The rating for the use of MS Access among respondents was 60.5 % for those who were either fair or poor as outlined in Table 4.13.

Table 4.13 Rating of Computer Applications among Respondents

Computer Application	Excellent %	Very Good %	Good %	Fair %	Poor %	Total %
Word Processing	10.0	32.0	44.0	10.0	4.0	100
Spreadsheet	6.3	15.8	26.6	30.5	21.1	100
Power Point Presentation	6.5	9.8	45.7	25.0	13.0	100
MS Access	3.3	8.8	27.5	37.4	23.1	100
Excel	11.5	17.7	47.9	14.6	8.3	100
Internet	14.6	31.2	37.5	6.2	10.4	100
SPSS	2.2	4.4	11.0	19.8	62.6	100

Source: Field Data April 2009.

The use of Excel recorded 77.1 % of respondents rating their competence as excellent, very good and good, whilst 22.9 % rated themselves as either fair or poor in the use of Excel. Rating of respondents on Internet browsing skills, recorded 83.3 % as excellent, very good and good, thus making the rating of Internet browsing skills one of the greatest competencies of respondents. In fact only 6.8 % of respondents rated their competence as fair or poor. The rating of the competence of respondents on the use of SPSS computer application presented a different picture. Eighty-two point four (82.4 %) rated their competence in the use of SPSS as either poor or fair as indicated in Table 4.13.

Another challenge or constraint facing the Polytechnic is the inadequate number of computers for staff and students in carrying out their teaching, learning, research and community service mandates through the application of e-business. For example, an institution of about 3,500 students and 350 staff has only 357 computers, 253 of which are located within the Computer Centre and 44 allocated to the management staff of the

Polytechnic. Out of the 357 computers, 225 of them are connected to the Internet for teaching and learning purposes. Of the 225 connected to the Internet, 188 are located in the Computer Centre, whilst 12 are within the Department of Statistics as contained in Table 4.14 and 4.15.

Statistics revealed that apart from the 44 computers used by management staff, 25 of them are connected to the Internet. This makes the level of Internet connectivity, among management staff 56.82 %. The level of computer connectivity among the teaching staff, excluding the Computer Centre which has 253 computers, is 20 %. This is because there are 60 computers out of which only 12 are connected to the Internet. Interestingly, none of the computers, located within the offices of management staff, are linked through Local Area Network to facilitate the sharing of vital management information as indicated in Table 4.14.

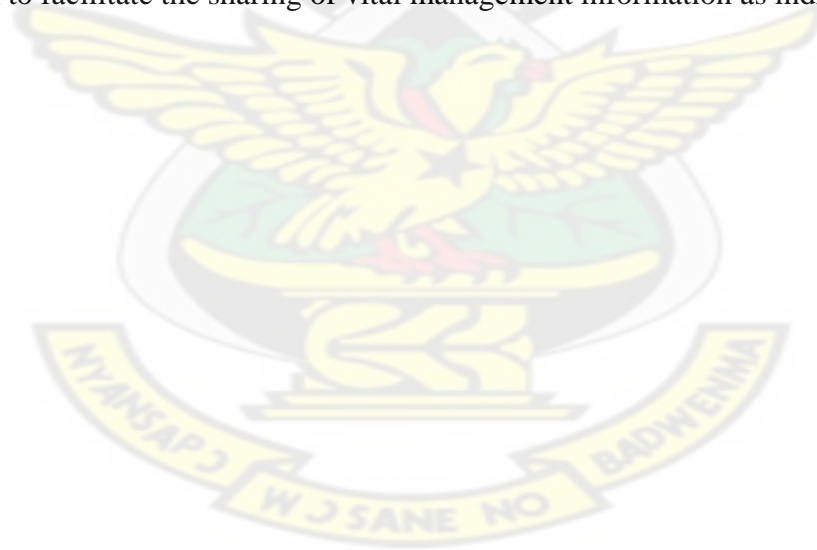


Table 4.14 Availability of Computers to Academic Staff of Ho Polytechnic

No	Academic Department	No. of Staff	No. of Computers	Ratio of Computers to Staff	No. Locally Networked	No. Connected to the Internet
1	Accountancy	14	4	1:3.5	Nil	Nil
2	Marketing	6	3	1:2	Nil	Nil
3	Secretaryship	7	2	1:3.5	Nil	Nil
4	Catering	15	4	1:3.8	Nil	Nil
5	Statistics	6	32	5.3:1	Nil	12
6	Fashion	11	2	1:5.5	Nil	Nil
7	Agric Engineering	14	2	1:7	Nil	Nil
8	Civil & Eng. B.Tech	14	2	1:7	Nil	Nil
9	Electrical Eng	7	2	1:3.5	Nil	Nil
10	Mechanical Eng	15	2	1:7.5	Nil	Nil
11	Liberal Studies	12	5	1:2.4	Nil	Nil
12	Computer Centre	7	253	36.2:1	Nil	188
13	Total	128	313	1:2.1	Nil	200

Source: Field Data April 2009.

For the purpose of computing the ratio of computers to staff, the 253 Computers at the Computer Centre were not used since there were meant for Computer Literacy lectures for students rather than for staff use.

An important aspect of the use of e-business as a tool for managing the value chain of educational programmes is the availability and ratio of institutional computers to staff. From

Table 4.14 above, the best ratios, with respect to academic departments, were found in the Computer Centre (36 computers to one person) and the Department of Statistics, where there were five computers to one person. These ratios are misleading because the 253 Computers at the Computer Centre and the 30 in the Department of Statistics were meant for students rather than for staff. When the Computers in the Computer Centre and those in the Department of Statistics are discounted, the best case ratio would be the Department of Marketing, where two people have one computer to themselves. The worst case scenarios were found in the departments Agricultural Engineering and Building Technology, where there was one computer to seven people as outlined in Table 4.14.

A further challenge or constraint facing the Polytechnic in the deployment of e-business as a tool for managing the value chain activities of educational programmes is the unreliable and very slow Internet connectivity at the Polytechnic. Respondents lamented how slow and unreliable the Internet service at the Polytechnic has been, which made browsing on the Internet for research, e-mail and other purposes, such a frustrating experience. To make a bad case worse, there has been frequent break down of the computers available at the Polytechnic due to fluctuating and unreliable power supply from the national grid (Aboagye 2009).

Table 4.15 Availability of Computers to Non-Academic Staff of Ho Polytechnic

No	Non-Academic Department	No. of Staff	No. of Computers	Ratio of Computers to Staff	No. Locally Networked	No. Connected to the Internet
1	Rector	5	4	1:1.3	Nil	2
2	Vice Rector	2	2	1:1	Nil	1
3	Registrar	33	13	1:2.6	Nil	9
4	Finance Office	14	10	1:1.4	Nil	9
5	Internal Audit Office	3	2	1:1.5	Nil	2
6	Development Office	2	2	1:1	Nil	1
7	Estate Office	1	1	1:1	Nil	1
8	Library	13	5	1:2.6	Nil	Nil
9	Planning Office	1	2	2:1	Nil	Nil
10	Industrial Liaison	1	2	2:1	Nil	Nil
11	Polytechnic Hostels	9	Nil	0:9	Nil	Nil
12	Dean of Students	1	1	1:1	Nil	Nil
13	Total	85	44	1:1.9	Nil	25

Source: Field Data April 2009.

Compounding the issue a little further, in the business of getting e-business to Ho Polytechnic, is the inadequate availability of information technology know how among the staff of the institution in some computer applications. As earlier stated, 82.4 % of respondents rated themselves as either fair or poor in the use of SPSS. In fact 62.6 % of respondents rated their competence in the application of SPSS as poor. With respect to

competence in the application of Access, 60.5 % were either fair or poor as contained in Table 4.13. This is arguably a very big challenge for a technological institution in the 21st century.

A critical examination of the current level of performing the value chain activities of educational programmes at the Polytechnic indicates that, the institution virtually accomplished all of its value chain activities manually. For example, 96.8 % of advertisements were manually executed, orientation for students 98.9 %, signing of the Matricula 99.0 %, billing of students 83.9 % whilst placement of students for Industrial Attachment was 97.9 % manually accomplished as indicated in Table 4.16.

On the contrary, Internet based transactions within the Polytechnic, still remain a novelty. For the first time in the history of the Polytechnic, some students were given the opportunity to register for their programmes through a pilot exercise during the second semester of 2008/2009 academic year. Indeed this innovation recorded 19.8 % Internet registration for programmes by students. This low Internet registration was because the necessary upgrading of format and orientation for students had not been done earlier. Those who managed to register online were given a special orientation that enabled them to register (Dzineku 2009).

Table 4.16 Current Level of Performing Value Chain Activities at Ho Polytechnic

No.	Activity	Manual	%	LAN	%	Internet	%
1	Advertisement of Programmes	90	96.8	3	3.2	Nil	0
2	Admission Forms	92	96.6	2	2.1	1	1.1
3	Students' Admission	91	94.8	3	3.1	2	2.1
4	Registration of Students	33	34.4	44	45.8	19	19.8
5	Orientation for Students	93	98.9	1	1.1	Nil	0
6	Signing of the Matricula	95	99	1	1.0	Nil	0
7	Billing of Students	78	83.9	12	12.9	3	3.2
8	Payment of School Fees	72	75.8	17	17.9	6	6.3
9	Assignment to Students	87	93.5	2	2.2	4	4.3
10	Industrial Attachment Placement	93	97.9	1	1.1	1	1.1
11	Performance Appraisal	88	94.6	4	4.3	1	1.1
12	Lecture Notes	90	95.7	3	3.2	1	1.1
13	Congregation Notices	94	96.9	2	2.1	1	1.0
14	Publications of Staff	83	91.2	6	6.6	2	2.2
15	Regulations for Students	92	96.8	3	3.2	Nil	0
16	Staff Orientation	92	98.9	1	1.1	Nil	0
17	Practical Training	88	95.7	2	2.2	2	2.2
18	Conditions of Service	94	97.9	2	2.1	Nil	0
19	Results of Students	86	88.7	9	9.3	2	2.1
20	Consultancy Services	87	93.5	6	6.5	Nil	0

Source: Field Data April 2009.

The development and deployment of e-business as a tool for managing the value chain activities of the Polytechnic, as earlier stated, is still a novelty. For example, the advertisement of programmes, orientation for students, signing of the Matricula, distribution of regulations for students, orientation for staff, distribution of conditions of service for staff and consultancy services by the Polytechnic, are yet to be put on the Internet for the benefit

of staff, students and the general public. This means that the provision of these programmes and services could not be accessed electronically via the Internet during this study as stated in Table 4.16.

Commenting on the need to apply e-business to the value chain activities of the Polytechnic, various levels of e-business application were recommended. Respondents took this position because in their opinion, the existing challenges and constraints would not allow full-scale e-business application possible. They therefore proposed that the application of e-business should be done hand in hand with the Local Area Networking, until the availability of Internet connectivity was more reliable and power supply less fluctuating (Aboagye 2009). Respondents, for example, recommended that 61.1 % Internet sale of admission Forms, 54.9 % advertisement of programmes, 42.7 % for registration of students and 50 % consultancy services be put on the Internet as indicated in Table 4.17.

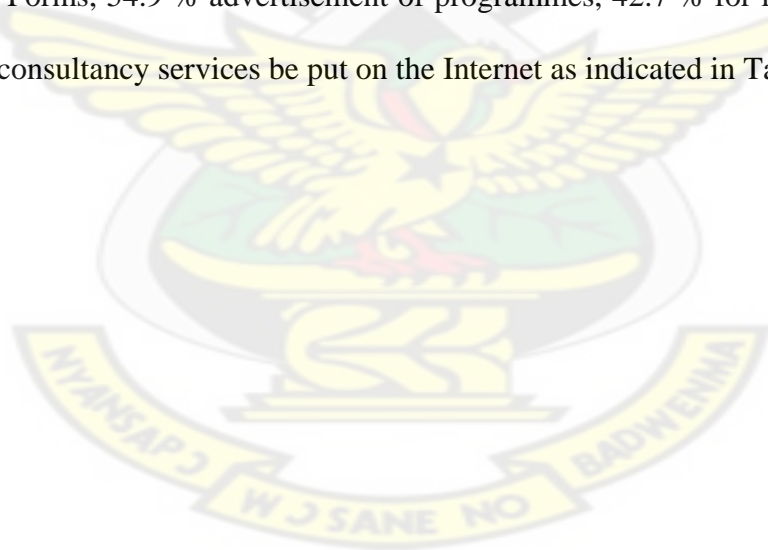


Table 4.17 Position of Respondents on the Need to Apply E-Business to the Value Chain Activities of Ho Polytechnic

No.	Activity	LAN	%	Internet	%	LAN & Internet	%	Total %
1	Advert. of Programmes	12	13.2	50	54.9	29	31.9	100
2	Sale of Adm. Forms	10	10.5	58	61.1	27	28.4	100
3	Admission of Students	28	30.1	50	53.8	15	16.1	100
4	Registration of Students	42	43.8	41	42.7	13	13.5	100
5	Orientation for Students	61	74.4	20	24.4	1	1.2	100
6	Signing of the Matricula	69	81.2	14	16.5	2	2.4	100
7	Billing of Students	54	56.2	40	41.7	2	2.1	100
8	Payment of School Fees	54	59.3	37	40.7	Nil	0	100
9	Assignment to Students	53	59.6	32	36.0	4	4.5	100
10	Industrial Attachment	49	54.4	36	40	5	5.6	100
11	Performance Appraisal	71	78.8	17	18.8	2	2.2	100
12	Lecture Notes	60	65.9	27	29.7	4	4.4	100
13	Congregation Notices	25	26.9	41	44.1	27	29.0	100
14	Publications of Staff	42	46.2	44	48.4	5	5.5	100
15	Regulations for Students	54	62.8	27	31.4	5	5.8	100
16	Staff Orientation	63	75.9	18	21.7	2	2.4	100
17	Practical Trg Placement	54	60.0	34	37.8	2	2.2	100
18	Conditions of Service	66	72.5	23	25.3	2	2.2	100
19	Results of Students	59	60.8	38	39.2	Nil	0	100
20	Consultancy Services	39	44.3	44	50.0	5	5.7	100

Source: Field Data April 2009.

In assessing the benefits of the application of e-business to the value chain of educational programmes, 83% of the respondents observed that it would improve efficiency and effectiveness, 80 % said it would increase productivity and reduce cost, and 79 % stated

it would increase the speed of delivery, whilst 34 % pointed out that it would improve customer relationship as indicated in Table 4.18.

Table 4.18 Assessment of the Benefits of E-Business to Ho Polytechnic

No.	Response	Yes (%)	No (%)	Total %
1	Improved Efficiency & Effectiveness	83	17	100
2	Increased Productivity	80	20	100
3	Reduced Cost	80	20	100
4	Increased Speed of Delivery	79	21	100
5	Improved Customer Relations	34	66	100
6	Total	356	144	100

Source: Field Data April 2009.

In an answer to the statement '*Application of e-business to the value chain activities of the Polytechnic would help to reduce cost, increase speed of operations, improve efficiency and maximise productivity in the transactions of the Polytechnic*', 99.0 % of respondents either strongly agreed or agreed with the statement. In fact, 66.3 % strongly agreed with the statement, whilst 32.7 % agreed with the statement as contained in Table 4.19.

Table 4.19 Application of E-Business to the Value Chain Activities of Ho Polytechnic

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agreed	65	65.0	66.3	66.3
	Agreed	32	32.0	32.7	99.0
	Disagreed	1	1.0	1.0	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

Sources: Field Data April 2009.

4.4 Benefits of Applying E-Business to the Value Chain Activities of Educational Programmes and Conditions for a Successful Implementation of E-Business Strategy

The advantage in the deployment and exploitation of e-business in education delivery is the subject matter of investigation in this research. In making the case for e-business, the real and potential competitive advantages in terms of cost reduction are paramount. The following are the real and potential benefits associated with an e-business venture. The application of e-business to the value chain of educational programmes at Ho Polytechnic would:

- Introduce polytechnic staff and students to the public by displaying their academic programmes, strategic plan and available consultancy services on the Internet.
- Strengthen the institutions relationships with industry, government agencies and the public, in accordance with the strategic plan and ICT vision of the institution.
- Ensure availability of information twenty-four hours per day at minimum cost and expand the ability of the Polytechnic to market its services to existing and potential clients.
- Promote interactive communications among staff, students and the general public through the development and maintenance of an e-community.
- Strengthen recruitment processes and procedures at minimal cost through e-advertisements and e-recruitment processes.
- Reduce cost, in terms of paper with regard to registration of students, orientation for staff and students, staff performance appraisal, lecture notes and assignments.

The main conditions for a successful website in an e-business strategy are creativity, ease of navigation, browser compatibility, loading time and the alignment of goals and objectives of the e-business to the Strategic Plan of the Polytechnic.

Creativity -The site should be creative enough to appeal to the target website visitors and clients. An organisational website design should be enhanced with forms, bulletin boards, search software, helpful links, foreign language areas, download/upload features and more. Well-designed feedback forms, for example, assist the user in formulating meaningful information, as pointed out by (Lorenzo 2003).

Ease of navigation - The navigational structure should be designed with the content and the intended audience in mind. Viewers should be able to navigate to desired locations within two or three clicks. Feedback forms should be made readily available to visitors in order to assess effectiveness and patronage of the website (Lorenzo 2003).

Browser compatibility – In the design of the Website for the Polytechnic, browser compatibility of software applications should be ensured. Some Web editing softwares have compatibility problems with other browsers. Loading time - Slow-loading sites are one of the greatest frustrations for website browsers. Busy visitors would not wait long (Lorenzo 2003). An institutional website should be attractive and still load quickly to avoid this frustration to browsers. Administrative costs of the Polytechnic could be drastically reduced through proper usage of the Website. Normal communications methods can be supplemented by referring clients to the Website. Forms and documents such as job applications, qualifications' criteria, newsletters, articles, maps, internal data, publications, could be placed on the Website. Databases would assist in managing data from a variety of locations.

Alignment: The Polytechnic should make sure that the website is aligned with the strategic goals and objectives as stated in its Strategic Plan and ICT Vision.

In summary, it could be stated that creativity and appeal of website; ease of navigation; browser compatibility with software applications; and the alignment of website with the strategic goals and objectives of the Polytechnic's strategic plan, are important in securing maximum benefits from e-business application.

4.5 Efforts being made by Ho Polytechnic to Address the Challenges and Constraints

Ho Polytechnic, in an effort to confront the challenges and constraints facing it, has embarked upon a series of measures to upgrade its ICT status. These measures include the crafting of an ICT Policy to guide its ICT agenda; an arrangement for staff to procure 150 personal laptop computers; the training of staff in the application of e-business to the value chain activities of the institution and the entry into an agreement with SocketWorks Global, an ICT service provider, to provide state-of-the-art ICT services to the Polytechnic in line with its ICT Policy.

Ho Polytechnic has a Draft ICT Policy in which the ICT Vision, mission, objectives and strategies have been outlined. The Draft ICT Policy summarises the current ICT status of the Polytechnic as 'less than desired.' The institution has wireless interconnectivity facility powered by VSAT with broadband upload of 256 Mega Bytes (MB) and download of 512 MB. The coverage and accessibility are very low at the moment. There is a computer application called SISCO School-Pro software which has been installed in the Academic Affairs Office for managing academic records of the Polytechnic. The programme has, however been bedeviled by constant and intermittent operational difficulties. The value chain activities of the Polytechnic Library have been computerised, despite the fact that an e-library is yet to be established. The Finance Office has effectively used the SISCO TOPAZ software in managing its value chain activities, like receipting fees paid by students

and payroll administration. The Finance Office is yet to use the facility for billing students (Ho Polytechnic Draft ICT Policy 2008).

The current computer-student ratio is 1:35 while computer-senior member ratio is 1:2. The construction of the Polytechnic Website has been completed. Information is however yet to be posted, whilst hosting arrangements are in progress. In view of the dynamic nature of technology it is difficult to make the ICT Policy time-bound. The policy will however, be implemented through a five year rolling plan in accordance with the Polytechnic Strategic Plan for the first 10 years (Ho Polytechnic Draft ICT Policy 2008).

The Polytechnic is making efforts to develop and deploy ICT as a tool for managing its educational programmes. The Draft ICT Policy has a *Vision* to make the Polytechnic a centre of excellence for exploiting ICT potentials in the teaching, learning, research and administrative activities. It has a *Mission* of using ICT to improve the effectiveness and efficiency of managing the academic and administrative value chain activities of the institution (Ho Polytechnic Draft ICT Policy 2008).

The goals of the Draft ICT Policy are stated below:

- To establish an efficient and cost-effective infrastructure for providing equitable access to local, national and international networks.
- To setup a management team with oversight responsibility for the development, deployment, maintenance and sustainability of ICT facilities and services.
- To develop an appropriate regulatory framework for ICT related issues
- To develop the requisite ICT manpower for the Polytechnic.
- To setup appropriate, reliable, secured, up-to-date and easily accessible Polytechnic databases.

- To motivate teaching, professional and technical staff to ensure the development of ICT by providing incentives and state-of-the-art equipment
- To provide an efficient protection for the ICT equipment and facilities.
- To promote widespread use of ICT applications for efficient teaching, learning, research and administration (Ho Polytechnic Draft ICT Policy 2008).

In line with its ICT Policy, the management of the Polytechnic has arranged the procurement of 150 laptop computers for staff of the Polytechnic as part of a capacity building effort (Aboagye 2009). The training of staff in the application of e-business to the value chain activities of educational programmes has commenced, with the training of staff in the Department of Secretaryship and Management Studies. Members of staff in this department have received training in the use of the Internet for giving and marking of assignments, giving lecture notes and dialoguing with students. Efforts are under way to extend this training package to other departments of the Polytechnic (Dzineku 2009).

The Polytechnic has in another effort, entered an ICT Agreement in 2007, with SocketWorks Global, an international ICT service provider. Under the ICT Agreement, SocketWorks Global is expected to provide training to staff of the Polytechnic in computer applications and know-how, establish a scholarship Foundation with four percent of the revenue to be generated from the use of the facility to support needy students (Ho Polytechnic-SocketWorks Agreement 2007). In addition, SocketWorks was to provide servers to the Computer Laboratories of the Polytechnic.

The statement of works and obligations in the agreement has outlined the following benefits of the e-education platform:

- Acquisition of a robust and modern ICT infrastructure at startup
- Provision of automation of Ho Polytechnic's operations and processes
- Provision of affordable and regular 24/7 access to the Internet at full implementation
- Facilitation of better faculty-student relationship arising from improved information flow and transparency
- Reduction of cash based transactions within the campus to improve cash flow from a better fees collection process
- Development of a Distance Learning or E-Learning Platform from the extra income to be generated (Ho Polytechnic-SocketWorks Agreement 2007).

The SocketWorks-Ho Polytechnic ICT Agreement has outlined the detailed benefits to be delivered to the Polytechnic by SocketWorks Global as follows:

1. Online Admission Application and Management

- Online student application
- Online application status monitoring
- Online application approval
- Online admission clearance
- Online student registration
- Electronic fee payment

2. Personalised Student Management System

- Course registration and management
- Online course monitoring
- Personal curriculum management
- Online publication of examination results
- Online Hostel/Hall application

- Personal Notice Board
- Discussion Forum
- Integrated Short Messaging System

3. Reports

- Reports builder
- Reports viewer

4. Records Management

- Courses Records
- Base Records
- Instructors Records
- Academic Advisers Records
- Students Records
- Transfers Records
- Fees Type Management Records
- Student Fees Management

5. Electronic Library

- Complete Online Public Access Catalogue (OPAC)
- Students' Electronic Book Acquisition System
- Electronic Library Management System

6. Online Grading System

- Assessment Plan
- Score Sheet Management
- Results Approval System
- Instructor/Head/Dean management System

- Result Correction System

7. Security

- Domain encryption and authentication
- Dedicated usernames and passwords
- Network Security
- Defined management access privilege
- Source code Security (Ho Polytechnic-SocketWorks Agreement 2007).

In return for these benefits Ho Polytechnic was to provide the following under the terms of the Agreement:

- Provision of space for the project office and adequate capacity Digital Centre or Computer Laboratory.
- Provision of all the necessary approvals to facilitate the project
- Sign a perpetual software agreement with SocketWorks Ghana Limited
- Approve Zenith Bank or any other bank in Ghana as consolidating bank for the project
- Ensure compulsory payment of access fees per student per semester by all students and remittance of the agreed portion to SocketWorks
- Ensure all data presented to the project is electronic and in the correct format
- Ensure that SocketWorks gets a minimum of 3,000 students to effectively run the project
- Provide accommodation for SocketWorks staff of two Engineers and possibly others, who shall be responsible for the operation of the system
- Assist in the administration of the Ho Polytechnic-SocketWorks Scholarship Foundation (Ho Polytechnic-SocketWorks Agreement 2007).

The SocketWorks-Ho Polytechnic Agreement is a move in the right direction towards achieving the ICT Vision of the institution. This ICT Agreement, if properly executed, would benefit the Polytechnic and lead to an improvement in the ICT situation. Nevertheless the Ho Polytechnic-SocketWorks Agreement contains certain shortcomings or limitations which might have an adverse effect on the Polytechnic.

One of the shortcomings in the Agreement is the provision that Ho Polytechnic shall, *'Sign a perpetual software agreement with SocketWorks Ghana Limited.'* There is strong evidence of stiff competition in the global ICT environment, resulting in higher quality service and fast falling prices. One wonders whether in the 21st century of globalisation, it is prudent for any organisation to enter an agreement of perpetual application and implication. This would mean that even when opportunities for higher quality software were available, the Polytechnic cannot opt for them without a breach of this ICT Agreement (Bokor 2009).

The second shortcoming is that the ICT Agreement does not appear to have a specific duration or a life span after which the client could take stock and review the quality of service it had received. It is perpetual. This is contrary to project ethics and standards, which expect all projects to have a beginning and an end. This apparent shortcoming is further compounded by the absence from the provisions of the Agreement, a consultant to provide an independent benchmark as basis for measuring the quality of service to be provided to enable the Polytechnic get value for money (Bokor 2009).

A further shortcoming in the Agreement is the provision that, the Polytechnic shall *'Provide accommodation for SocketWorks staff of two Engineers and possibly others, who shall be responsible for the operation of the system.'* The clause, 'and possibly others,' puts

an unquantified and an unquantifiable obligation on the Polytechnic in future, because as the work of SocketWorks Global expands, so will the need for accommodation for its staff also expand. Ho Polytechnic is already grappling with its own hydra-headed accommodation problems and care must be taken in order not to make a bad case worse (Bokor 2009).

In addition, there is a clause that states, the Polytechnic shall, '*Ensure compulsory payment of access fees per student per semester by all students and remittance of the agreed portion to SocketWorks*'. The Agreement is deemed to have come into effect in 2008. For well over a year now, very little has been done with respect to automation value chain activities of the Polytechnic as found out by this research. It is to be wondered how the remittances for SocketWorks Global would be determined when the job has remained largely unexecuted.

Finally, SocketWorks does not appear to be getting the needed co-operation from the staff especially the heads of departments in the implementation of the terms of the agreement with regard to provision of information for upgrading the system (Dzineku 2009).

Table 4.20 Recommendation on the Application of E-Business to the Value Chain Activities of Ho Polytechnic

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Recommended	65	65.0	66.3	66.3
	Recommended	32	32.0	32.7	99.0
	Not recommended	1	1.0	1.0	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

Sources: Field Data April 2009.

Respondents demonstrated a good understanding of e-business and the benefits to be derived from its application to the value chain activities of the Polytechnic. They however

lamented the slow and unreliable Internet connectivity at the Polytechnic, despite the contraction of SocketWorks Global to upgrade the institution's ICT facilities. When respondents were asked what their recommendations were on the application of e-business to the value chain activities of Ho Polytechnic, 97 % of the respondents either strongly recommended it or recommended it. In fact 65 % strongly recommended it whilst 32 % recommended it for implementation as stated in Table 4.20.

4. 6 Discussion of Findings

The main research question is: 'Can e-business be applied to the value chain of Ho Polytechnic to help reduce cost, maximise productivity and improve efficiency? The specific research questions of the study are: What are the challenges and constraints facing Ho Polytechnic in performing its value chain activities? What efforts are being made to address these challenges and constraints? What are the benefits of applying e-business to the value chain activities of the Polytechnic? Can e-business be applied to the value chain activities of Ho Polytechnic to reduce cost, improve efficiency and maximise productivity?

The hypothesis of the study is: 'The application of e-business to the value chain activities of Ho Polytechnic can help to reduce cost, improve efficiency and maximise productivity in the delivery of educational programmes.'

These research questions guided the discussion of finding of the study. On the challenges and constraints facing the Polytechnic in performing its value chain activities manually, it was found that they include, non-availability of computers and inadequate competence among respondents in certain computer applications, limited local area

networking of computers and unreliable Internet connectivity resulting in a preponderance of manual execution of value chain tasks.

There is a remarkably high computer literacy among the respondents at the Polytechnic, with 72 % of them using computers for research activities, 71 % using computers for browsing the Internet, whilst 65 % used their computers for preparing lecture notes. The possession of computers is high among respondents, with 88.9 % of them personally possessing computers. This is due largely to an arrangement for 150 laptop computers by the Polytechnic for staff on hire purchase terms.

Local area networking of computers for the purpose of sharing information is very low at the Polytechnic. Seventy-nine point six (79.6 %) of respondents who owned computers did not have any local area networking for sharing information. It was also found out that 77.8 % of respondents did not correspond with students through e-mail, whilst 45.5 % of them used the e-mail to reschedule their lecture periods.

On communication through the e-mail, it was found that 47.5 % of the issues communicated were personal, as against 5.1 % for issues of strategies for achieving the objectives of the Polytechnic. There was a varying degree of competence in computer application among respondents. Rating on the application of word processing was 86 % for excellent, very good and good. The rating on the use of SPSS was 82.4 % fair and poor, whilst the rating for Access was 60.5 % for fair and poor. This means the competence of respondents in the application of SPSS and MS Access is very weak.

It is important to underscore the significance of SPSS in the tertiary system, because one of its major roles is the conduct of research. A deficiency in the competence of staff in the application of SPSS is therefore uncomplimentary in a tertiary system. The management of the Polytechnic needs to make every effort to remedy this disturbing gap in the application of SPSS among staff of the Polytechnic, if its research role is to be meaningfully accomplished.

The rating of respondents in Internet browsing skills was 83.3 % excellent, very good and good. Since Internet browsing skills are critical to e-business application, the respondents could be deemed to be ready for an e-business venture. It was also disclosed that the computer-staff ratios are less than desired across the departments. Whilst some departments like Marketing had one computer to two members of staff, other departments like Agricultural Engineering and Building Technology had one computer to seven members of staff. This situation might be evidence of inequity in the distribution of the resources of the Polytechnic.

A major finding of the research is that Ho Polytechnic continues to do the bulk of its value chain activities manually. For example, 96.8 % of advertisements were manually executed, orientation for students 98.9 %, signing of the Matricula 99.0 %, billing of students 83.9 % whilst placement of students for Industrial Attachment was 97.9 % manually accomplished.

It was found out that, for the first time in the history of the Polytechnic, some students were given the opportunity to register for their programmes online during the second semester of 2008/2009 academic year. Indeed this innovation recorded 19.8 %

Internet registration for programmes by students. This Internet registration was due to the efforts of SocketWorks Global, an international Internet service provider, contracted by the Polytechnic to automate the value chain activities of the institution.

Despite the ICT Agreement with SocketWorks Global in October 2007, for automation of the value chain activities of the Polytechnic, advertisement of programmes, orientation for students, signing of the Matricula, distribution of regulations for students, orientation for staff, distribution of conditions of service for staff and consultancy services of the Polytechnic, were not put on the Internet for the benefit of staff, students and the general public.

There is a perception, among respondents, that SocketWorks Global lacks the capacity and expertise to provide the services outlined in the Ho Polytechnic-SocketWorks Agreement and that the Polytechnic was not receiving value for money (Bokor 2009). This perception was further compounded by the feeling among respondents that, the Project Manager of SocketWorks Global being the son of the Registrar of the Polytechnic, and the Assistant Project Manager being the daughter of the Former Rector of the Polytechnic were put there benefit from the deal. This perception was according to the Project Manager of SocketWorks Global was effecting level of co-operation the Project was receiving from staff and students of the Polytechnic (Dzineku 2009). There was, however a good understanding of e-business and its application to the value chain activities of the Polytechnic among respondents.

On the benefits of applying e-business to the value chain of the educational programmes of the Polytechnic, 83% of the respondents observed that it would improve efficiency and effectiveness, 80 % said it would increase productivity and reduce cost, and 79 % stated it would increase the speed of delivery. Consequently, 99.0 % of the respondents recommended the application of e-business to the value chain activities of the Polytechnic.

The research further revealed the existence of other challenges and constraints confronting the Polytechnic in its bid to go ICT. These challenges and constraints include; unreliable Internet connectivity and very slow functionality of the Internet when it is eventually available; inappropriate design of the current Computer Laboratory of the Polytechnic; frequent break down of available computers and air-conditioners due to fluctuating and unreliable power supply from the national grid; lack of funds to readily repair the computers and air-conditioners when they break down; inadequate technical know-how and competence in computer application among staff; difficulty in getting specified accessories, parts and equipment due to failure to involve consumer departments in the procurement process and limited number of polytechnic computers for staff and students to facilitate the deployment of a meaningful e-business venture.

With regard to efforts being made, the research discovered that the Polytechnic has embarked upon certain measures to confront the challenges and constraints facing it. Some of the measures include:

- The crafting of an ICT Policy to guide the ICT agenda of the Polytechnic
- Training of staff in the use of available ICT facilities to facilitate the implementation of e-business in the Polytechnic.

- Entry into an agreement with SocketWorks Global, an international ICT service provider, to provide a state-of-the-art automation to the Polytechnic in accordance with its ICT Policy
- Arrangement for staff to procure 150 laptop computers to boost computer literacy among them.

Through these efforts the Polytechnic could be deemed to be positioning itself for the business of e-business to reduce the cost of its operations, improve efficiency and effectiveness of delivery, and maximise productivity among its staff and students.



CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the conclusion and recommendations of the study on e-business as a tool for managing the value chain of educational programmes at Ho Polytechnic.

5.3 Conclusion

The hypothesis of the research is: 'The application of e-business to the value chain activities of Ho Polytechnic can help to reduce cost, improve efficiency and maximise productivity in the delivery of educational programmes.' Answers have been found to the research questions raised in the statement of the problem. The Polytechnic is facing serious challenges and constraints in a bid to automate its operations. The challenges have been clearly identified and efforts are being made to address them. The benefits of e-business have been acknowledged by respondents. There is an overwhelming endorsement of the need to apply e-business to the value chain of the Polytechnic

Certain conclusions can therefore be drawn:

1. Most of the value chain activities of the Polytechnic are still manually executed despite the agreement with SocketWorks for over a year ago to automate the operations of the institution.
2. There is Internet connectivity at the Polytechnic, being provided SocketWorks Global, but it is unreliable, unstable and very slow, thus creating considerable frustration among staff and students in their teaching, learning and research work.

3. Fluctuating power supply has resulted in the damage of computers and air-conditioners at the Polytechnic, whilst lack of ready funding for their repairs when they break down has aggravated the situation.
4. The Services of SocketWorks Global are below the standards contained in the Agreement with the Polytechnic. This situation is unduly delaying, the e-business agenda of the Polytechnic.
5. The ratio of official computers to staff is poor, whilst the existing computers are not networked to facilitate the sharing of information.
6. Possession and use of personal computers among respondents is very high especially with respect to word processing and browsing the Internet, despite poor rating in the use of SPSS and Access

5.3 Recommendations

Based on the conclusions made above the following recommendations are being made:

1. The Agreement with SocketWorks Global should be re-examined and reviewed to ensure that the Polytechnic gets value for money
2. The training package for staff should be extended to all the departments to build capacity for staff in the application of e-business to the value chain activities of the Polytechnic.
3. The management of the Polytechnic should be pro-active towards implementing the ICT Policy of the institution for the benefit of all.
4. More official computers should be procured to improve the computer-staff ratio as capacity building for the application of e-business.

5. Management of the Polytechnic should endeavour to include consumer departments in the procurement process to ensure that the needed specifications of parts and equipment are procured.

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APPENDIX A

E-Business as a Tool for Managing the Value Chain Of Educational Programmes at Ho Polytechnic

The purpose of this questionnaire is to collect responses from staff and management of Ho Polytechnic on the application of E-Business to the Value Chain of Educational Programmes at Ho Polytechnic. Your candid opinion on the subject would be useful in this research. Your views and opinions would be treated with confidentiality.

Thank you.

Personal Data of Respondents

Please tick the appropriate responses to the following set of questions:

1. Gender Male ☐ Female ☐
2. Please indicate your age group
 - a) 20-29 ☐ b) 30-39 ☐ c) 40-49 ☐ d) 50-59 ☐ e) 60 & Above ☐
3. What is your highest level of formal education?
 - a) HND ☐ b) First Degree ☐ c) Masters Degree ☐ d) PhD ☐
4. For how long have you been in the service of Ho Polytechnic?
 - a) One to five (5) years b) Six (6) to 10 years c) Eleven (11) to 15 years
 - d) Sixteen (16) to 20 years e) More than 20 years

Level of Computer Literacy/Experience

5. Please rate/rank your level of Computer literacy.
 - a) Very Literate ☐ b) Literate ☐
 - c) Moderately Literate ☐ d) Not Literate ☐
6. Do you have a Computer in your office or at home? Yes ☐ No ☐
7. If yes, what do you use your Computer(s) for (please tick as many as are applicable)
 - a) Research Activities ☐ b) Browsing the Internet ☐
 - c) Lecture Notes ☐ d) Power Point Presentations ☐

8. Have the Computers in your Department/office been networked to facilitate the sharing of information?

a) Yes ☐ b) No ☐

9. Do you communicate with students through the e-mail? a) Yes ☐ b) No ☐

10. If yes, what do you communicate with students through the e-mail?

a) Assignments b) Lecture Notes c) Postponement/rescheduling of Lectures
d) Regulations for Students e) Any other.....

11. Do you communicate with your colleagues through e-mail? a) Yes ☐ b) No ☐

12. If yes, what do you normally communicate with colleagues through the e-mail?

a) Personal Issues b) POTAG/Mgt Issues c) Conditions of Service Issues
d) Workload Challenges e) Strategies for achieving the objectives of the Polytechnic

13. How will you rate your competence in the following Computer Applications?

Application	Excellent	Very Good	Good	Fair	Poor
Word Processing					
Spreadsheet					
PowerPoint Presentation					
Access					
Excel					
Internet Browsing					
SPSS					

14. If you have been browsing the Internet at Ho Polytechnic, how do you find the speed of Internet Services?

a) Very Fast ☐ b) Fast ☐ c) Slow ☐ d) Very Slow ☐

Level of Automation Activities at Ho Polytechnic

15. Please indicate the current level of automation of the following activities at Ho Polytechnic.

No.	Activity	Done Manually	Computerised Local Area Network	Computerised Internet Based
1	Advertisement of Programmes			
2	Sale of Admission Forms			
3	Admission Letters to Students			
4	Registration of Students			
5	Orientation for Students			
6	Signing of the Matricula			
7	Billing of Students			
8	Payment of School Fees			
9	Assignment to Students			
10	Industrial Attachment Placement			
11	Staff Performance Appraisal			
12	Lecture Notes			
13	Congregation Notices			
14	Research Publications of Staff			
15	Regulations for Students			
16	Orientation for Staff			
17	Placement for Practical Training			
18	Conditions of Service for Staff			
19	Results of Students			
20	Consultancy Services			

Application of E-Business to Core Activities of Ho Polytechnic

16. In your opinion, which of the following activities at Ho Polytechnic could be desirably done online to reduce cost, maximise productivity and improve efficiency?

No.	Activity	Computerised Local Area Network	Computerised Internet Based
1	Advertisement of Programmes		
2	Sale of Admission Forms		
3	Admission Letters to Students		
4	Registration of Students		
5	Orientation for Students		
6	Signing of the Matricula		
7	Billing of Students		
8	Payment of School Fees		
9	Assignment to Students		
10	Industrial Attachment Placement		
11	Staff Performance Appraisal		
12	Lecture Notes		
13	Congregation Notices		
14	Research Publications of Staff		
15	Regulations for Students		
16	Orientation for Staff		
17	Placement for Practical Training		
18	Conditions of Service for Staff		
19	Results of Students		
20	Consultancy Services		

17. How would you assess the benefits of the application of e-business (Internet) to the academic and non academic activities of Ho Polytechnic? (Tick as many as possible)

- a) Improve Efficiency and effectiveness
- b) Increase productivity
- c) Reduce Cost
- d) Increase speed of delivery
- e) Improve customer relation

18. Application of e-business to the value chain activities of the Polytechnic would reduce cost, increase speed of operations, maximise productivity and improve efficiency in the academic and administrative transactions of the institution.

- a) I strongly agree
- b) I agree
- c) I disagree
- d) I strongly disagree

19. What is your recommendation on the application of e-business to the value chain activities of Ho Polytechnic?

- a) I strongly recommend e-business application
- b) I recommend e-business application
- c) I don't recommend e-business application
- d) I strongly cannot recommend e-business application

Thank you

APPENDIX B

Interview Schedule for the Management of Ho Polytechnic

‘E-Business as a Tool for managing the Value Chain activities of Ho Polytechnic’

1. What is the ICT vision of Ho Polytechnic

.....

.....

.....

2. What is the state of ICT at Ho Polytechnic today in relation to the ICT vision.....

.....

.....

3. What are the main challenges and constraints facing ICT at the Polytechnic.....

.....

.....

4. What efforts are being made by the Polytechnic to achieve its ICT aspirations and expectation.....

5. What are your recommendations for improvement

.....

.....

.....

Thank you