Tertiary Institutions' Value Chain Management through ICT: Evidence from Kumasi Polytechnic

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Abstract

The study explored the use of ICT as a tool for managing the core businesses of Kumasi Polytechnic so as to have an urge over its competitors. The main objective of the research was to assess the prospects of applying I.C.T to the core activities of Kumasi polytechnic in order to help the institution reduce cost, maximize productivity and improve efficiency in the management and delivery of educational programmes thereby achieving a competitive advantage. Questionnaires were used to gather data on the ICT agenda of the Polytechnic. The study found out that there is a good understanding among respondents of ICT and the benefits of applying it to the value chain activities of the institution to reduce cost improve efficiency and maximise productivity. Data collected showed that, the use of ICT in the core business of educational institutions can create and sustain superior performance thereby increasing profitability, operational excellence and increased productivity and profitability.

Introduction

It is an undisputable fact that, advances in Information and Communications Technology has brought about improvement in the way and manner in which schools and for that matter tertiary level, businesses and organizations are managed.

Higher education is approaching the point at which Science and Technology particularly Information and Communication Technology (ICT), plays a vital role in nearly all phases of the educational processes. The development of information technology has dramatically increased the quantity of information available in digital form. A digital firm is one in which nearly all of the organization's significant business relationships with customers, suppliers, and employees are digitally enabled and mediated. What makes ICT and for that matter, information systems so essential today? Why are businesses investing so much in information systems and technologies? In the United States, more than 23 million managers and 113 million workers in the labor force rely on ICTs to conduct business (Kenneth C. Laudon and Jane P. Laudon, 2006).

Information systems are essential for conducting day-to-day business in the United States and most other advanced countries, as well as achieving strategic business objectives.

According to Laudon and Laudon (2006), business firms specifically invest heavily in information systems to achieve six strategic business objectives: operational excellence; new products, services, and business models; customer and supplier intimacy; improved decision making; competitive advantage; and survival. There is therefore the need for tertiary institutions including polytechnics to fully adopt the concept of ICT in its core activities to achieve such objectives. Information and communication technologies (ICT) have become commonplace entities in all aspects of life.

Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavours within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centred learning settings and often this creates some tensions for some teachers and students. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century

During the last two decades higher education institutions have invested heavily in information and communication technologies (ICT). ICT has had a major impact in the tertiary education context, in organization and in teaching and learning methods. Every institution of higher learning uses computers in their educational programs. In many institutions, this information technology (IT) revolution has taken place without institutional policies in place. The potential educational uses of the Internet and World Wide Web add urgency to the need for institutional policies that protect the interest of participants while assuring the best educational use of these expensive resources. But one cannot be sure that all the new computers and networks appearing in classrooms will really make a difference for learners. It is still uncertain that the money and time invested in them makes a difference. The migration of records from paper-based to IT systems has made possible a far greater range of uses of information and has made it easy to solicit and collect information. With the emergence of the internet, the world has been truly reduced to a global information village. This world-wide network, though designed to serve the information needs and interests of all facets of the society, has provided a great boost to library and educational services worldwide. It is now a well known fact that internet connectivity fosters an unparalleled degree of communication, collaboration, resource sharing and information access.

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 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, maximize production, improve efficiency and achieve a competitive advantage.

One of the areas of Ghana's educational sector where the application of technology is important is the tertiary education. 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. 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).

Specifically in relations to the Kumasi Polytechnic, most of its transactions and activities of Kumasi 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 level of motivation among staff as a result of poor conditions of service.

The application of I.C.T to the activities in the value chain of the Polytechnic is expected to help reduce cost of education delivery, increase productivity and efficiency. The general objective of the study is to assess the prospects of applying I.C.T to the core activities of Kumasi polytechnic in order to help the institution reduce cost, maximize productivity and improve performance in the management and delivery of educational programmes thereby achieving a competitive advantage. Specifically the study seeks to investigate the extent to which application of ICT in the value chain of Kumasi Polytechnic will help improve performance in teaching and learning.

The Need for ICT in Tertiary Institution

According to Kaka (2008), the role of Information and Communication Technology (ICT), especially internet in the education sector plays an important role, especially in the process of empowering the technology into the educational activities. Education sector can be the most effective sector to anticipate and eliminate the negative impact of ICT. Technology (internet) in another side can be the most effective way to increase the student's knowledge. Kaka further explained that, being aware of the significant role of ICT (internet) in our life, especially in the educational activities, education authorities should be wise enough in implementing the strategies to empower ICT in supporting the teaching and learning process in the classroom. ICT is not just the bloom of the educational activities, but also it will be the secondary option to improve the effective and meaningful educational process.

He said: The main purpose of the Strategy for Information and Communication Technology Implementation in Education is to provide the prospects and trends of integrating information and communication technology (ICT) into the general educational activities. There are some unavoidable facts in the modern education; First**,** the ICT has been developing very rapidly nowadays. Therefore, in order to balance it, the whole educational system should be reformed and ICT should be integrated into educational activities. Second**,** the influence of ICT, especially internet (open source tool) cannot be ignored in our student's lives. So, the learning activities should be reoriented and reformulated, from the manual source centered to the open source ones. In this case the widely use of internet access has been an unavoidable policy that should be anticipated by schools authorities. Third**,** the presence of multimedia games and online games by internet has been another serious problem that should be wisely handled by the educational institutions. The students cannot be exterminated from this case.

They can have and do with it wherever and whenever they want. Schools, as a matter of fact, do not have enough power and time to prevent or stop it after school times. Meanwhile, most parents do not have enough times to accompany and control their children. So, the students have large opportunities to do with multimedia games or online games or browsing the negative and porn sites. Having been addicted, the students will have too little time to study, and even do not want to attend classes. Kaka further explained**,** the implementation of ICT in education has not been a priority trend of educational reform and the state paid little attention to it. Therefore, there should be an active participation, initiative and good will of the schools and the government institutions to enhance ICT implementation at school. He said again that**,** the teachers should be the main motivator and initiator of the ICT implementation at schools. The teachers should be aware of the social change in their teaching activities. They should be the agent of change from the classical method into the modern one. They must also be the part of the global change in learning and teaching modification. The followings are the aim and objectives of ICT implementation in education:

- To implement the principle of life-long learning / education.
- To increase a variety of educational services and medium / method.
- To promote equal opportunities to obtain education and information.
- To develop a system of collecting and disseminating educational information.
- To promote technology literacy of all citizens, especially for students.
- To develop distance education with national contents.
- To promote the culture of learning at school (development of learning skills, expansion of optional education, open source of education, etc.)
- To support schools in sharing experience and information with others.

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.

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).

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

The emergence of ICT 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. ICT 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).

An e-marketplace is an essential component of ICT. 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).

The electronic medium associated with ICT has the potential of increasing the speed in service delivery and communication.).

This dramatically reduces purchasing, production, and cycle time. ICT 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 ICT offers numerous organisational benefits including reduced costs and improved customer service.
Successful ICT strategies emphasise the importance of organisational innovation and willingness to change. To implement ICT 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. 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:

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

ICT 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. ICT is a paperless transaction, meant to save cost and put an organisation at a competitive advantage (Burn 2007). The potential advantage in the deployment and exploitation of ICT in the delivery of educational programmes, in order to reduce cost, maximise productivity and improve efficiency is the subject matter of this research.

Amegashie-Zigloo (2009), a researcher posits that 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. Value chain analysis can help an institution determine which type of competitive advantage to pursue, and how to pursue it.

Porter (1985) identified five competitive forces interacting within a given industry: the intensity of rivalry among existing competitors, the barriers to entry for new competitors, the threat of substitute products and services, the bargaining power of suppliers, and the bargaining power of buyers. Analyzing these forces will reveal the industry's fundamental attractiveness, expose the underlying drivers of average industry profitability, and provide insight into how profitability will evolve in the future, given different changes among suppliers, channels, substitutes, competitors, or technology.

The structural attractiveness of the distance education industry is also determined by the same five underlying forces. In 2001, Porter argued that, while the Internet has helped distance education to expand impressively, it has only changed the front end of the industry process (p. 66).

The pressure on administrators comes from the changing cost structure that the Internet and the use of ICTs produce; that is, a reduction in variable costs and a tilting of cost structures towards fixed costs (Porter, 2001). In fact, compared to other distance education systems, online learning requires a heavy investment in technology (computers; servers; learning specific hardware; learning systems; acquiring authoring development tools, delivery tools, and collaboration tools; etc.) and also requires specialists (multimedia instructional designers, Web designers, technologists, faculty, etc.) to develop, run, and integrate mediated instructions.

In fact, Woudstra & Powell, (1989) posit that, the application of the Internet and ICT to distance education is enabling the integration of the industry's entire value system; that is, the set of value chains in an entire industry, encompassing those of suppliers, channels, organizations, and buyers of educational services. For example, an online learning organization can incorporate the suppliers' design capabilities to reach back to its suppliers' value chains to form linkages, improve response capabilities, share costs, and gain competitive advantage . They are again of the view that, by connecting various activities and players in the value system, the use of Internet and ICT in distance education will optimize its workings, including sourcing, production, delivery, and service to students.

Porter (1985) suggested that Value chain analysis is thus a means for examining internal processes and identifying which activities are best provided by others. According to Porter (2005) the university and other tertiary institutions enter into a contract for tuition and other services with a student when they register in a particular course. A registration is considered a sale, as funds change hands for access to the course and for purchase of the learning materials. The core revenue stream of the online learning institution derives from the provision of learning; therefore, tuition is often considered the main source of revenue for such institutions. The preparation of brochures, advertising materials, and the university calendar is the traditional and main marketing strategy to promote the university's offerings. Given the nature of online learning, the online university must craft a branding strategy to communicate the benefits, attributes, culture, and competitive advantage of the institution and its unique online learning offerings; it must also establish strategic partnerships and alliances that are able to give the institution a unique position in the minds of stakeholders. The service sector provides online support (technical and academic) to learners, counseling, tutoring, marking of assignments and examinations, delivery and invigilation of examinations, and maintenance of student records. It also includes learner self-service through Web sites and Web portals. Source: Adapted from Porter (2001).

Materials and Methods

The study adopted a quantitative approach by designing and administering a likert scale questionnaire to gather quantitative data. This study employed the simple random sampling to select staff on which questionnaires were administered in the various departments. 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 ICT 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 200 respondents, representing 50% of the total population made up of the following category of staff: Two research assistants were trained to assist in data collection. The fieldwork took one month to complete. After the design of the questionnaire it was pretested. Problems detected during the pre-test were used to fine tune the final questionnaire. Questionnaires were then administered with the help of the research assistants.

Data Analysis

The data was determined for factor analysis by employing Kaiser–Meyer-Olkin measure of sampling adequacy (KMO-MSA) and Bartlett's Test of Sphericity. A KMO value of more than 0.60 and a significant value for the Bartlett's Test of Sphericity were recorded. A Varimax rotation and principle components analysis for factor analysis was analysed. All the factors that had factor loadings lower than 0.50 were eliminated after which a Cronbach's alpha reliability analysis was conducted. We ensured that all measure of sampling adequacy exceeded the Cronbach's alpha reliability value threshold level of 0.60 and large and significant Bartlett's Test of Sphericity.

Descriptive statistics and inferential statistics have been used to analyse the hypotheses that:

- H0: There is a strong use of ICT in value chain activities in Kumasi Polytechnic
- H1: The use of ICT in value chain activities in Kumasi Polytechnic is not strong

If we are treating H_1', H_1'' and H_0 with different probabilities given that

$$\beta = \beta' + \beta'' > 1 - \alpha.$$

Thus, $\Pr\{t \in H_1' \cup H_1'' \mid t \in (-c, c)\}$

$$= \frac{P\{t \in (-c,\ c) \mid H_1'\ or\ H_1''\}}{P\{t \in (-c,\ c) \mid H_1'\} + P\{t \in (-c,\ c) \mid H_1''\} + P\{t \in (-c,\ c) \mid H_0\}}.$$

This implies that the probability that the test value belongs to H_0 on condition that we observed

t in the confidence region, $\Pr\{t \in H_0 \mid t \in (-c,\ c)\}$.

If we underline that we are treating H_1', H_1'' and H_0 with the same probability, the

$$\Pr\{t \in H_1' \cup H_1'' \mid t \in (-c, c)\}$$

$$= \frac{P\{t \in (-c,\ c) \mid H_1'\ or\ H_1''\}}{P\{t \in (-c,\ c) \mid H_1'\} + P\{t \in (-c,\ c) \mid H_1''\} + P\{t \in (-c,\ c) \mid H_0\}}.$$

This value represents the probability that the test statistic is obtained under the two alternative hypotheses other than the initial one

Results

Table 1: Current Level of Performing Value Chain Activities at Kumasi Polytechnic

1(a)   One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Advertisement of Programmes	200	1.60	.491	.035
Admission Forms	200	1.48	1.173	.083
Students' Admission	200	1.32	.950	.067
Registration of Student	200	1.54	.500	.035
Orientation of Student	200	1.58	1.419	.100
Signing of the Matriculation	200	1.92	1.358	.096
Billing of Students	200	1.16	1.394	.099
Payment of School Fees	200	1.14	1.389	.098
Assignment to Students	200	1.18	1.231	.087
Industrial Attachment Placement	200	1.60	.491	.035
Performance Appraisal	200	1.48	1.173	.083
Lecture Notes	200	1.32	.950	.067
Congregation notices	200	1.54	.500	.035
Publication of Staff	200	1.58	1.419	.100
Regulation for Students	200	1.92	1.358	.096

1(b)   One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Advertisement of Programmes	46.072	199	.000	1.600	1.53	1.67
Admission Forms	29.894	199	.000	1.480	2.32	2.64
Students' Admission	34.544	199	.000	1.320	2.19	2.45
Registration of Student	43.588	199	.000	1.540	1.47	1.61
Orientation of Student	25.712	199	.000	1.580	2.38	2.78
Signing of the Matriculation	30.420	199	.000	1.920	2.73	3.11
Billing of Students	32.051	199	.000	1.160	2.97	3.35
Payment of School Fees	31.964	199	.000	1.140	2.95	3.33
Assignment to Students	36.535	199	.000	1.180	3.01	3.35
Industrial Attachment Placement	46.072	199	.000	1.600	1.53	1.67
Performance Appraisal	29.894	199	.000	1.480	2.32	2.64
Lecture Notes	34.544	199	.000	1.320	2.19	2.45
Congregation notices	43.588	199	.000	1.540	1.47	1.61
Publication of Staff	25.712	199	.000	1.580	2.38	2.78
Regulation for Students	30.420	199	.000	1.920	2.73	3.11

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 most of its value chain activities manually. For example, 96.8% of the advertisements were manually executed, orientation for students 98.9%, signing of the Matriculation 99.0% billing of students 83.9% whilst placement of students for industrial Attachment was 97.9% manually accomplished as indicated above

Internet based transactions within the Polytechnic; still remain a novelty though from questions. Students can track them on the institution's website where information is still being uploaded according to the Head of Department of ICT unit. For the first time in the history of the Polytechnic, some students were given the opportunity to register online for their programmes through a pilot exercise during the second semester of 2008/2009 academic year. Indeed this innovation recorded about (20%) 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 either. Those who managed to register online were given a special orientation that enabled them to register.

Commenting on the need to apply ICT to the value chain activities of the Polytechnic, various levels of ICT application were recommended. Respondents took this position because in their opinion, the existing challenges and constraints would not allow full-scale ICT application possible. They therefore proposed that the application of ICT 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. Respondents, for example, recommend 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 below.

Table 2: Assessment of the Benefits of ICT to Kumasi Polytechnic

1(a) One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Improved Efficiency & Effectiveness	200	3.60	.491	.035
Increased Productivity	200	3.48	1.173	.083
Reduced Cost	200	3.32	.950	.067
Increased Speed of Delivery	200	3.54	.500	.035
Improved Customer Relations	200	3.58	1.419	.100

1(b) One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Improved Efficiency & Effectiveness	46.072	199	.000	3.600	1.53	1.67
Increased Productivity	29.894	199	.000	3.480	2.32	2.64
Reduced Cost	34.544	199	.000	3.320	2.19	2.45
Increased Speed of Delivery	43.588	199	.000	3.540	1.47	1.61
Improved Customer Relations	25.712	199	.000	3.580	2.38	2.78

In assessing the benefits of the application of ICT to the value chain of educational programmes, it can be inferred from table 4.1 that, (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. In an answer to the statement 'Application of ICT to the value chain activities of the Polytechnic would help to reduce cost, increase speed of operations, improve efficiency and maximize 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, whist (32.7%) agreed with the statement as contained in table 4.10 above. This presupposes that, application of ICT in the core business can reduce cost, brings operational excellence, and maximize productivity

Conclusions

A major finding of the research is that Kumasi 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 Matriculation cards (99.0 %), billing of students(83.9 %)whilst placement of students for Industrial Attachment was (97.9 %) manually accomplished even though 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. 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.

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 2009/2010 academic year. Indeed this innovation recorded (20%) internet registration for programmes by students. Despite the ICT Agreement with Socket Works Global in October 2007, for automation of the value chain activities of the Polytechnic, advertisement of programmes, orientation for students, signing of the Matriculation cards, 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 was, however a good understanding of ICT and its application to the value chain activities of the Polytechnic among respondents. In making the case for ICT, the real and potential competitive advantages in terms of cost reductions are paramount. The following are real and potential benefits associated with and ICT venture as the third research question investigates. The application of ICT to the value chain of educational programmes at Kumasi 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 (time-shifting) 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.

In an answer to the statement 'Application of ICT to the value chain activities of the Polytechnic would help to reduce cost, increase speed of operations, improve efficiency and maximize 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, whist (32.7%) agreed with the statement. This is a clear indication that, ICT alignment in the overall value chain would help reduce cost, increase cost of operations, improve efficiency and maximize productivity in the transactions of the polytechnic thus having an edge over competitors.

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