CHAPTER III

REVIEW OF LITERATURE

3.0 Introduction

As literature review will enable to know what has already been done to the related field of studies by many researchers earlier, various tools techniques used for data collection and analysis and the findings of the earlier studies, a detailed search for related literature was conducted by browsing databases such as EBSCOhost, Wiley InterScience, ScienceDirect, Emerald and Internet. There were some related studies about Information and Communication Technology (ICT) and human resource development. According to the objectives of the study, this review with chronological order is presented in five main parts viz., application of ICT; impact of ICT on training; impact of ICT on productivity; impact of ICT on performance; and impact of ICT on job satisfaction.

3.1 Application of ICT

Information and communication technology is widely applied in different organisations and sectors such as firms, banks, universities, schools, transport industry, construction industry, agricultural sector, entrepreneurship etc. Some of them are presented here.

Arshad (2000) studied e-commerce in terms of its functions, operation, and impact on marketing system and to evaluate advantages and disadvantages of e-commerce to consumers and firms and finally the prospect and challenges of e-commercializing the agricultural-marketing in Malaysia.

According to Shin (2003), Information Technology (IT) is widely used to achieve more efficient coordination by reducing the costs of coordinating business resources across multiple markets. Because of the need for coordination of
business resources across multiple markets, diversification can increase the demand for IT.

Meera, Jhamtani, and Rao (2004) concluded emphasizing the need for ICT in all endeavors of agriculture development, from a comparative study of three projects from India, and how agriculture policies could be reoriented in this context.

Giannopoulos (2004) examined the possibilities that were opened and for the whole decade from the application of Information and Communication Technologies (ICTs), in the field of Transport.

Munkvold and Tundui (2005) analysed the role of IT in supporting women entrepreneurs in urban Tanzania. They found that women entrepreneurs had started using the new technology to improve their businesses. Most of them were using email and Internet services to communicate with their business partners and friends. Internet services were also being used to search for product related information. Several positive effects from using IT were reported, such as increased sales, access to new customers and markets, and improved efficiency of operations. Lack of financial resources and lack of computer skills were reported as the major barriers for accessing IT services. The results indicated that providing funding schemes and access to IT training programs are of key importance for stimulating human resource development through further adoption and use of IT services among women entrepreneurs in Tanzania.

Pouyioutas, Poveda, and Kalogerou (2005) studied and presented the Intercollege Intranet, Intercollege’s Web-Based Teaching and Learning Environment (IWBTLE), which had been developed within the strategic aims of the College to offer better services to students and faculty. Moreover, its impact on students and faculty was discussed.
Phougat (2006) believes that IT offers the ability to increase the amount of information provided to all participants in the agricultural sector and to decrease the cost of disseminating the information. Moreover, IT allows farmers to save time on order and delivery as well as getting feedback. IT is playing an important and vital role in agricultural production and marketing. For example, farmers, agricultural researchers, cooperatives, suppliers and buyers use the Internet to exchange ideas and information, as well as to conduct business with each other. Machinery, seed chemicals and other types of agricultural products can be purchased and sold online.

Tas and Irlayici (2007) carried out a survey on the current and planned use of IT and its impact on the construction industry in Turkey. The current level of usage and the future expectations for building product information system had become widespread in Turkey. The development of building product information systems was said to be an important step to solve many problems in construction industry field.

Oladapo (2007) investigated the state of ICT in the Nigerian construction industry identifying its impact in the industry and the constraints to its adoption. The main uses of ICT and the top five constraints to the use of ICT were stated. A comparison with results of similar studies indicated that IT usage was quite high for a developing country like Nigeria.

In their article, Stienen, Bruinsma, and Neuman (2007) explored the potential contribution of ICT to the livelihoods of small-scale farmers and the efficiency of the agricultural sector in developing countries.

Ashrafi and Murtaza (2008) studied the use and impact of ICT on Small and Medium Sized Enterprises (SMEs) in Oman. The results showed that only a small number of SMEs in Oman were aware of the benefits of ICT adoption. The main driving forces for ICT investment were to provide better and faster customer
service and to stay ahead of the competition. Lack of internal capabilities, high cost of ICT and lack of information about suitable ICT solutions and implementation were some of the major barriers in adopting ICT.

Huda, Tabassum, and Ahmed (2009) studied use of ICT in the private universities of Bangladesh. It was found that use of ICT in these universities was increasing and the level of use of ICT was also satisfactory. The employees and the students were getting benefited due to the use of ICT in the administrative and teaching processes.

Shaikh (2009) studied usage, acceptance, and adoption of information technologies in higher education in Pakistan. He used normative Delphi method (electronic survey research) in order to measure expert views of participants regarding how effectively ICTs could be integrated in higher education system of Pakistan.

Chuang, Nakatani, and Zhou (2009) investigated the effect of compositions of managerial/demographic characteristics of the top management team (TMT) on the extent of IT adoption in small businesses (SMEs), where such strategic decisions made by TMT had direct and significant influence on all aspects of business operations and its competitive position in a market.

3.1.1 Application of ICT in Libraries

Literature search shows that there is an extensive body of literature investigating the application of information and communication technologies in libraries. However, an attempt is made here to highlight some of studies which have been conducted in different countries to determine the level of IT application in their libraries.

Mohammed (1991) examined the state of library automation in academic and special libraries in Nigeria. It was found that the automation of library systems
in Nigeria had spread from academic and special libraries to the public, and there were also a number of companies/institutions engaged in the provision and servicing of computer hardware and software including management information systems. He concluded that the future of library automation in the country was bright.

Farajpahlou (1994) illustrated the state of automation in Iranian academic libraries. It was found that the UNESCO software, CDS/ISIS, was playing a major role in computerized library services in Iran. However, library automation in Iran was encountering some serious problems. Lack of networked bibliographic databases, unadjusted status of library education programs in regard to dealing with modern technologies and lack of structured strategic plans for library automation were the main problems that the Iranian academic libraries had to cope with.

George (1994) found that the main reasons for non-computerization of libraries in Kerala, India were financial constrains, lack of encouragement from authorities, lack of computer awareness of the authorities, staff and users of the libraries.

According to Amekuedee (1995), library automation in university libraries in Ghana was a relatively new concept. Even though computers had been installed in the three university libraries in Ghana, computerization had not had much impact on the services provided by these libraries. The barriers militating against successful university library automation included financial problems, attitudinal problems, lack of co-operation among university libraries, hardware and software problems and personnel problems.

Furness and Graham (1996) reported that 95% of the special libraries in the UK used computers for some aspects of library and information services and used
different software package depending upon particular application. The library catalogue was the most popular aspect of automation in special libraries in the UK.

Haider (1998) stated that automated systems were lacking in large university libraries, as well as in college and public libraries in Pakistan. The largest group using this technology was special libraries. These libraries used automation primarily for a few selected operations. Some private sector universities had taken steps towards the planning and implementation of integrated library systems, but these were in the trial stages. The National Library in Pakistan had also just made similar steps. The UNESCO software, CDS/ISIS, was the most commonly used software. The major constraints on library automation included: Absence of planning, non-availability of software, import restriction on choice of hardware, lack of competent manpower, non existence of standard, and absence of co-operation.

Barlow and Graham (1999) investigated the use of ICT in industrial and commercial libraries in the UK. They reported that the use of purchased software packages for typical library housekeeping operations, such as cataloguing and circulation was more prevalent than in-house developed systems in commercial libraries in the UK. They also found that the library catalogue was the most popular area for automation. A good number of the organizations used computers for some aspects of their library and information services. ICT was used for a range of office and other applications including email, word processing, spreadsheets, presentation packages and database management systems.

Moscoso and Molina (1999) reviewed the state of computerization of Spanish libraries. They stated that whereas the first library automation systems were introduced in the UK, USA and Canada in the early 1970s, the first experiences in Spain dated from the following decade. Lack of institutional support for library modernization tended to be compensated for by the dedication
and commitment of professionals across the library system, particularly in the Spanish university and research library sector. The principal problem pending was the modernization of the National Library, which has been in the slow process of reform over the past 20 years.

Kasi Rao (2000) investigated application of information technology (IT) in special libraries, information and documentation centers (LIBIDOCS) in Chennai, India. It was found that Foxpro, dBase, ORACLE, Visual Basic, and indigenous software packages were in the popular use for IT application in special libraries in Chennai.

Moorthy and Karisiddappa (2001) assessed the use of information technology infrastructure in libraries in India. They reported that a majority of libraries were using CDS/ISIS as library software and LibSys software was a distant second. They also found that a majority of libraries under survey have purchased the software while a few libraries reported to have developed the library automation software in-house. In addition, a good number of libraries in India were subscribing to CD-ROM database and were willing to migrate to online journal to satisfy the demands of their users.

Davarpanah (2001) examined the level of IT application in university libraries in Iran. The paper concluded that the automation of Iranian university libraries was a continuous exercise. He also concluded that rank of the application and designed features in order of importance among Iranian University Libraries were as follows: (i) computerized cataloguing system, (ii) CD-ROM database, (iii) computerized periodical system and local area library network, (iv) national or in-house database, (v) computerized documentation system and facsimile services, (vi) computerized circulation system and e-mail, (vii) Internet services, (viii) computerized audio-visual system, (ix) computerized cataloging search system and on-line database, (x) computerized accounting or management system.
Nyamboga and Kemparaju (2002) examined the availability of different information technologies (automation, networks, electronic mail, online searching, CD-ROM searching, telefacsimile, personal computer applications and the World Wide Web or Internet) in six university libraries in Karnataka, India. They found that university libraries in Karnataka still lagged behind some other Indian universities in the applications of information technology, but the introduction of Internet access was an important step forward.

Davarpanah (2003) in his study on university libraries in Iran reported that due to language barriers, an overwhelming number of these libraries had utilized commercial library-oriented packages developed in the country. The most widely used Iranian library software packages were respectively, Pars Azarakhsh, Nosa, Kavosh, Ganjineh. University libraries associated with the Ministry of Health, treatment and Medical Education relied on either Nosa or Pars Azarakhsh software packages. The findings also indicated that 90.20% of libraries had computerized cataloguing systems and 82.35% had CD-ROM databases, other popular application of technology available to the library services included computerized periodicals system (49%), local area library networks (49%) and national or in-house databases (34.78%). Internet services, electronic mail, online databases, and automated library services, such as circulations and acquisitions existed in 31.37% of surveyed libraries.

Kumar (2003) investigated the library automation process of five university libraries of Haryana, India and found that these libraries had acquired CDS/ISIS as their first library automation package.

Thapa and Sahoo (2004) found that the lack of trained professional, negative towards automation and unsatisfactory libraries software were some of the more reasons for the slow progress of automation of special libraries in Jabalpur.
Simata Makondo and Katuu (2004) examined the extent to which the University of Zambia Library was addressing the information technology (IT) sustainability challenges. The findings showed that most of the IT facilities in the Library were not functioning. That was attributed to such factors as poor funding, lack of support from the university administration, and shortage of staff.

Ali (2004) found that out of the seven libraries in the educational media in Delhi, four libraries were using locally designed software packages whereas the other three used off-the-shelf software packages. It was observed that most of the libraries needed proper computer hardware, software, and networking.

Amekuedee (2005) conducted an evaluation of library automation in some Ghanaian university libraries and found that even though the university libraries realised the importance of library automation, they were hampered by lack of funds, lack of support from the university administrations, and lack skilled staff to embark on automation of all library processes.

Haneefa (2005) stated that the budget allocations to a majority of the libraries in Kerala, India were not adequate and the IT skill and expertise of the library staff of the majority of the libraries were not satisfactory.

Ani, Esin, and Edem (2005) studied the extent of adoption of ICT in university libraries in Nigeria. The results of the questionnaire survey showed that only six university libraries were fully “computerized”, nine were “about to be computerized”; seven of the surveyed libraries had installed local area networks, five had online public access catalogue and only four libraries provided Internet service. The major obstacles that influenced effective adoption of ICT in university libraries were inadequate funds and the poor state of electricity in Nigeria.

Haneefa (2007) investigated the application of ICT in special libraries in Kerala, India. The analyses revealed that though the libraries had hardware,
software, and communication facilities to some extent, ICT-based resources and services were not reaching the users to the expected extent. Library automation in special libraries in Kerala was largely commenced during the period 1990-2000. CDS/ISIS was used more in the libraries than any other software. The library catalogue found to be the most popular area for automation. The ICT-based resource used by the largest percentage of the users was the e-mail. Most of the libraries were hampered by lack of funds, lack of infrastructure, and lack of skilled professionals to embark on automation of all library management activities and application of ICT.

Sinha, Chakarborty and Bhattacharjee (2007) stated that in the beginning, the major constrains of library automation were absence of planning, non-availability of vendor developed software at affordable prices, restrictions on the import of hardware, lack of trained manpower, lack of power supply, non-existence of standards, and absence of co-operation.

Borang and Sarma (2008) surveyed application of ICT in two major academic institution libraries of Arunachal Pradesh i.e., Rajiv Gandhi Central University Library and NERIST (North Eastern Regional Institute of Science and Technology) Library. The results revealed that, although, some significant developments in the use of ICT in two libraries had been seen, still lagged behind in the development and in the application of the automation software acquired for the purpose. Most of the libraries were not following a systematic plan in using ICT. It required an imaginative, intelligent planning and huge investment of fund including the skilled human resources.

Mohsenzadeh and Isfandyari-Moghaddam (2009) investigated the status of ICT in academic libraries located in Kerman, Iran. Results showed that the level of application of information technology in Kerman academic libraries was acceptable, but they should improve their status to match with ever-increasing
demand for better library services at universities. The most important problem was lack of educated librarians, which needs a suitable investment and planning.

Abdelrahman (2009) investigated the current situation of ICT implementation and training at the University of Khartoum Library System (UKLIS). The findings revealed that although the ICT infrastructure at the University of Khartoum was available, yet the ICT situation at the UKLIS was deplorable, and that the training programmes available were inadequate for that purpose. Insufficient strength of staff with professional and ICT skills, together with lack of management experience, training and commitment had played an important role in the deplorable condition at the UKLIS.

Ramzan and Singh (2009) investigated the levels of IT in Pakistani libraries. More specifically, they focused on the status of computers and other commonly used hardware, e-mail, internet, library software, automated user services, expenditure on IT and online resources available in academic libraries of Pakistan. The questionnaire survey showed that a low level of IT availability, especially the absence of computers, e-mail and internet in few libraries. Similarly, the libraries were far behind to achieve excellent IT levels. It was found that libraries need to be fully automated using standard library software/management systems. However, access to online resources through the Higher Education Commission (HEC) was found extensive and comprehensive. The data indicated the need to enhance libraries’ IT expenditure.

Anie and Achugbue (2009) examined the current state of ICT policies in the provision and utilization of library services and resources. The results revealed that most Nigerian universities had not adopted library ICT policies, and where the policies had been adopted and implemented, the libraries were faced with various constraints.
Walmiki and Ramakrishnegowda (2009) surveyed the status of ICT infrastructure in six selected university libraries in Karnataka, India. The results showed that the libraries greatly varied from one to another as far as the ICT infrastructure was concerned. Most of the libraries lacked sufficient hardware and software facilities and did not have adequate internet nodes and bandwidth. The campus LANs of the universities were not fully extended to exploit the benefits of digital information environment.

Sampath Kumar and Biradar (2010) examined the application of ICT in 31 college libraries in Karnataka, India. The results showed that application of ICT in Indian college libraries had not reached a very high level. Lacks of budget, manpower, as well as lack of skilled staff and training were the main constraints for not automating library activities. Even though library professionals had shown a positive attitude towards the use of ICT applications and library automation, they needed extensive and appropriate training to make use of ICT tools.

Rajput and Gautam (2010) carried out a questionnaire survey to know the status of library automation and problems in their implementation in special libraries of Indore city, Madhya Pradesh, India. The study explained the various problems faced by authorities and the staff during the process of automation. Lack of trained staff, hesitancy in learning computer and technical problems were the major hindrances to speedy automation.

Tavassoli Farahi and Ramesh Gandhi (2011) carried out a study to investigate and compare the current state of information technology in medical libraries in Karnataka, India and Iran. Tools used for data collection included questionnaire, observational visits, and informal interviews with selected librarians. Although medical libraries in both countries had hardware, software, and communication facilities to some extent, they should strive to achieve excellent IT levels. A good number of libraries had library management software.
However, only few medical libraries in both countries were fully automated. Iranian librarians ranked lack of institutional support, funds, trained and skilled professionals, and absence of planning and training courses, as the most important problems in IT application, while none of the options were rated as the most important problems militating against effective use of information technology by Indian medical librarians.

3.2 Impact of ICT on Training

Study of literature shows that impact of ICT on training can be regarded in two aspects. Some studies illustrate the use of ICT in training while some of them imply the necessity of training due to introduction of ICT. Therefore, this review is presented in two parts, viz. use of ICT in training; and necessity of training due to introduction of ICT.

3.2.1 Use of ICT in Training

“Although ICTs were used in teaching and training prior to 1995, advances in ICTs and this level of integration into teaching and training become more advanced, portable, and mainstream after 1995. With the advent of the commercial era of the Internet, the penetration of information technology into education and training had become more visible and universities and colleges entered an era of competition for survival. Moreover the demand from commerce and industry intensified for graduate students who were better prepared for the increasingly technology-based market place” (Akir, 2006, p. 64).

According to Steeples and Chris (2002) (as cited in Akir, 2006), over the last two decades, a great deal of research has been done on examining the effects of computer-supported learning. The rapid growth in computer-based ICTs is creating new opportunities for universities and corporations to manage teaching and training differently. In order for societies to be economically and socially
We must be successful in the new knowledge-based world, a highly skilled and well-trained population is required.

According to Clickering and Ehrman (1997), modern communication technologies provide increased opportunities for interaction that are useful for problem solving, sharing resources, and enhancing face-to-face contact.

According to United States Department of Defense data, we have short-term retention of approximately 20% of what we hear, 40% of what we see and hear, and 75% of what we see, hear, and do. Trainees complete courses with multimedia in one-third of the time as those receiving traditional instruction, and reach competency levels up to 50% higher. In addition, in most cases the overall cost of instruction is lower (as cited in Gantt, 1998).

Some authors (e.g., Duggan et al., 2001; Wood, 1995, as cited in Akir, 2006) believe that the growth in number and variety of information and communication technologies has signaled a major transformation in teaching and training processes. Corporations and institutions of higher learning are increasingly adopting ICT as tools for learning, collaboration, communication, curriculum development and staff development. Issues of ICT for education and training are more critical today than ever before since new means of improving instructional methods are triggering a change in the delivery of education (Pajo & Wallace, 2001, as cited in Akir, 2006).

Schank (2001) believes that teaching and learning also benefits in illustration of difficult concepts with animation or video and providing simulations and gaming in carrying out training and scientific experiments. With Internet technologies, educators and learners can work collaboratively anytime, almost anywhere. The classroom experience is no longer limited to a physical space. It can now be extended through virtual private networks to include online classrooms characterized by an open and collaborative learning environment.
Sigala, Airey, Jones, and Lockwood (2001) studied the training provision of Small and Medium Tourism and Hospitality Enterprises (SMTHEs) in the UK. On-the-job training was heavily used and perceived as effective as other less used training methods. Furthermore, multimedia-based training was very limited despite its low costs, high flexibility, effectiveness, and all its other benefits.

In his doctoral dissertation, Akir (2006) investigated information and communication technology systems and their applications and use in teaching and training in universities and corporations. The aim was to identify and map studies that might shed light on the impact of ICT systems on teaching and training, and to undertake an in-depth analysis of the identified literature. A qualitative systematic review was conducted to develop a framework for the integration of ICTs into teaching and training in universities and corporations.

Kavathatzopoulos (2003) discussed use of ICT in the training for ethical competence in Business. Furthermore, he stated that ICT has special qualities that can offer a lot to training for ethical competence as well as its application in real professional life. The use of ICT must be based on exactly those features that make it good, that is, memory capacity, communication ability, organization, systematization, complexity simulation, and reality representation.

Harrington and Walker (2004) stated that there were numerous reports about the ways nursing and medical schools have integrated computer-based training into their curriculum (Adsit, 1996; Merril and Barker 1996; Russell, Miller, & Czerwinska, 1994; Zelmer, 1995). Moreover, they discussed the effectiveness of computer-based training compared with the traditional instructor-led format. The computer-based and instructor-led versions of a fire safety training program were presented to staff of nine nursing facilities. Participants were randomly assigned to the computer-based or instructor-led groups. Both groups significantly increased their scores from pretest to posttest. The computer-based
group significantly outperformed the instructor-led group on the knowledge subtest at posttest. Participants reported that they enjoyed the computer-based training and had no difficulty using the computers. The researchers concluded that computer-based training could be an effective and efficient alternative training technique.

In their book, Mishra and Sharma (2004) mention that “multimedia has been a favorite area for organizations as a means of training employees. Urdan and Weggen (2000) (as cited in Mishra and Sharma, 2004) found online training being given preference by organizations, considering that with this method, employees can be trained in less time, with less cost, and more effectively than with other methods. In the modern society, where computer and Net technologies are becoming indispensable, the learning technologies are found to be deployed in all sectors: schools, colleges, universities, and industries. The emergence of the knowledge and educational content industry, the emergence of virtual campuses of learning, the availability of new learning and training tools, and the deployment of such tools to meet the diverse needs of learners have greatly influenced education and training systems”.

“The ECDL has now become a prerequisite for many public library jobs, with adverts for posts placing possession of an ECDL pass as a core competency for the post. Many authorities chose this as the default qualification for staff because it was a pre-existing package, but also because there was the opportunity to undertake the training online, which prevented the additional need of freeing up staff time for essential training. One prominent study of the People’s Network training by Spacey (2003) (as cited in King, et al. 2006) evaluated the training methods used in 14 local authorities in England to teach public library staff about

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1 The European Computer Driving License (ECDL) is a pre-existing training package built around seven core aspects of ICT. These core modules were: Basic concepts of IT, Using the computer and managing files, Word processing, Spreadsheets, Database, and Information and communication (internet and e-mail).
the internet. The majority of authorities surveyed in this study were using the ECDL to train staff for outcome 1 as outlined by the Lottery's New Opportunities Fund (NOF). The research found that although individuals obviously had personal preferences towards teaching methods, it could be (tentatively) concluded that online training in the public library could continue to grow in popularity”.

In their article entitled “Advanced methods for astronaut training: Computer based training and virtual reality technology”, Romano et al. (2007) presented an overview of the critical aspects and the applicable training method, related to the astronaut preparation for the missions to the International Space Station (ISS). Furthermore, computer-based training, an advanced method to be used by the space station astronaut trainees, was discussed.

In their study, Stefanov et al. (2007) showed that ICT could enhance the process of teacher training, and could be used for lifelong competence development of teachers. They resulted that the use of Learning Design Centered Software Platform for lifelong competence development could enhance the in-service training of teachers.

Kotnis (2008) described use of IT in trainings. The results were based on data from questionnaires dedicated to companies rendering training services with the use of multimedia and/or via Internet on the field of management in Poland. The results indicated that there was low demand on trainings with the use of multimedia on the polish training market. The managers were afraid of using the computer technology in training. Including the multimedia technology to the training’s process was very expensive and return of cost could never be done. Although companies offering such trainings were more flexible and were capable of organising a large number of trainings, the conducted analysis showed that the polish society was not sufficiently developed yet in terms of technology to attend trainings with the use of digital means.
Su, Lin, and Chang (2008) investigated the learning proficiency of using computer animations, digital archives, power point bulletins, and e-Plus software as the multimedia technology teaching texts in the science learning process. The results showed that in the multimedia learning environment, teachers had positive learning outcomes toward incorporated learning; teachers cared much about learning proficiency after they got more in touch with incorporated computer teaching; it was helpful for teachers to unite animation literature, images and sounds into their teaching, and to have concrete understanding from abstract texts.

Kajuna (2009) examined the classroom practices and what surrounded the learning and teaching processes using technology from the perspective of teachers and students at the University of Dar-es-Salaam in Tanzania. The findings revealed that although there were significant efforts and positive attitudes toward the use of computers in learning and teaching, the process of technology integration at the university faced impediments that affected its effectiveness. The impediments included lack of enough computers, absence of sound computer knowledge and skills of teachers and students so as to effectively integrate technology into learning and teaching, absence of adequate and effective teachers’ professional development programs on technology, and lack of effective technology planning and technology plans.

Akuna (2010) states that organizations now employ instructional designers who consider “what makes people learn best”? Models of good practice in Web-based training (WBT) are also being developed by such companies as Funderstanding, a design company that specializes in education on the Web. And as a testament to the success of training on the Web incorporating multimedia rich content, Ernst and Young trained 24,000 of their employees in less than 18 months in 110 cities. Their next step is to take the training world-wide, they still have 55,000 employees to train!
Akuna (2010) opines that in businesses and industry computer-based training (CBT) provides on-the-job training for employees in a time-sensitive way at a reasonable cost. With the many types of CBT training tutorials available, employees receive step-by-step instruction, instant and positive feedback in a non-threatening environment, and above all, learn at their own pace. Multimedia is a key factor in blurring the line between education and training.

3.2.2 Necessity of Training due to Introduction of ICT

Research has shown that ICT has led to an increase in the demand for skills and thus higher training needs. Several studies examining the necessity for library staff to embrace training are prominent in the literature. They highlight the need for library staff to have continued training in order to best serve customers and fully integrate ICTs into the everyday routine of library work. Such integration would allow staff to use their new ICT skills on a regular basis and become more familiar and comfortable with ICTs. This section gives an overview of some studies in this regard.

MacLeod and Chiware (1993) opine that librarians must be adequately trained in order to exploit the new technology. Furthermore, there are certain prerequisites for successful training. Libraries in developing countries face additional problems in the area of training for information technology.

Marmion (1998) examined competency and skills that the staff in today’s libraries lack and the technological challenges facing the library profession today. Marmion concluded that the biggest technology challenge facing the library profession today is that of preparing our employees to use the technology effectively. To meet this challenge, “libraries must pay much more attention to technology training and computer skills than they traditionally have in the past” (p. 216).
According to Riggs and Zhang (1999) for libraries to remain effective in a rapidly changing technological environment, “they must be learning organizations and must promote, not only the learning of individuals, but more importantly, the collective learning of all members of the entire organisation” (p. 793).

Yesufu (2000) (as cited in Ajidahun, 2007) agrees that training of personnel enhances productivity. According to him, “education and training were generally indicated as the most important direct means of upgrading the human intellect and skills for productive employment”.

Li (2001) (as cited in Zhang, 2004) believes that “librarians and library staff are constantly required to learn; they must upgrade their skills and knowledge, as well as adapt to changes just to perform the same function in this new environment”.

Hazemi and Hailes (2002) (as cited in Zhang, 2004) recommend that “all institutions should, …review the changing role of staff as a result of communication and information technology, and ensure that staff and students receive appropriate training and support to enable them to realize its full potential”.

In his article entitled “Need of HRD in Library”, Sahrma (2002) states that professional competencies are further identified as knowledge in the area of information, resources, technology, management and research and the ability to use these areas of knowledge as a basis for providing library and information services. Also, he believes that IT has brought in many changes in LIS education and profession. To keep up with the technological development and learn to accept these changes and pressure they belong to, the library professionals need continuous training and development in IT skills. It is essential at this time of upsetting changes to ensure that such training is not enabling them to improve
their job performance, but also providing them with supportive help as they acquire new and essential skills.

Allen (2003) (as cited in Zhang, 2004) reviewed libraries functioning in rapidly changing and increasingly complex environments. The author concluded that in order to maintain and develop their services in these challenging situations, libraries must develop their staff. A crucial success factor appears to be the ability of staff at all levels to develop their learning skills so that they can be responsive to change.

Richardson and Gillespie (2003) (as cited in Sieben et al., 2007) state that automation increases the demand for skill and training by working as a substitute for simple, repetitive tasks and leaving the more complex tasks for employees to carry out.

Ali (2004) in his study on application of information technology in the educational media libraries in Delhi observed that there was a need of training library professionals to make use of the ICT based resources and services optimally.

King, McMenemy, and Poulter (2006) reported the findings of a web-based survey into staff perceptions of the UK-wide ICT training conducted under the People’s Network program for public library staff. It was found that while staff found the training rewarding, there were concerns at the lack of ICT troubleshooting in the program, and the reliance on an off-the-shelf training program not specifically designed for libraries, namely the European Computer Driving License (ECDL). The paper suggested that ICT training for library staff should be built around problem solving and troubleshooting, rather than generic skills, in order to match the kinds of queries encountered in the front line of libraries.
Obajemu and Ibegwam (2006) carried out a survey of 84 participants at the cataloguing, classification and indexing group of the Nigeria Library Association workshop in 2004 with a view to determining the impact of the annual workshop on the application of ICT to cataloguing and classification in Nigerian libraries. The results showed that the workshops organized in recent years had spurred the action of the participants at those workshops to further pursue ICT (78%). The findings also revealed that the workshops had had positive impact on the participants with respect to the application of ICT to cataloguing and classification.

Moarefzadeh and Sannei Dehkordi (2006) demonstrated, in order to keep up librarians with the information technology innovations, in-house and continuous training program is needed for them.

Ajidahun (2007) took a critical look at library education and training of human resources in information and computer technologies in twenty–one Nigerian university libraries. Result showed that many academic librarians and other categories of library staff were not computer–literate. Moreover, training programs for staff development in information technology in Nigerian university libraries was grossly inadequate.

Mohammed (2008) asserts that "Information and Communication Technologies (ICTs), particularly the Internet, Intranet and other network technologies have continued to impact positively on the methodologies of library and information service delivery, education and training of information providers as well as the information needs and seeking behavior of the information seekers and users" (as cited in Abubakar, 2010).

Udoh-Iloechine (2009) assessed the types of training programs available and the impact of training on the employees at the Petroleum Training Institute library. It was found that there was an awareness of the availability of training in
the library. About half of the respondents had experienced long-term formal training, and nearly 70% have experienced short seminars and workshops. Nearly three quarters of respondents felt that they had acquired new skills that helped them with their work, and the same portion agreed that training helped motivation. More than half the respondents felt that lack of funding did not have a negative effect on the training programs. Moreover, the author stated that staff development was especially urgent in libraries because of the challenges posed by modern technology and the resulting information explosion. Technological advancement has rendered old skills obsolete.

Safahieh and Asemi (2010) assessed the levels of computer skills and computer use experience of librarians in one of Iranian universities. The findings showed that the majority of the respondents did not possess a good level of computer skills and even their long duration experience of computer use had not necessarily improved their level of computer literacy skills. It was suggested that in-house and continuous training programs was needed for librarians to be adequately equipped with the computer literacy skills to take advantage of all computerized library facilities and enhance their work productivity. They stated that library managers preferred professionals and librarians who were computer literate because they were more productive and efficient at work than those who were not computer literate.

In a questionnaire-based survey, availability and use of ICT in six Nigerian university library schools were studied by Abubakar (2010). It was found that all the six library schools studied used the acquired ITs for various purposes notably for education and training. Moreover, the majority of academic staff in the Library Schools used the available ITs on a daily basis, which could be as a result of their indispensability to the present day LIS training and education.
Tavassoli Farahi and Ramesh Gandhi (2011) conducted a questionnaire-based survey to elicit IT skills needed for LIS professionals working in medical, dental, and pharmacy colleges affiliated to Rajiv Gandhi University of Health Sciences (RGUHS) in Karnataka, India; and Ministry of Health and Medical Education and Islamic Azad University (IAU), Iran. Results revealed that all the skills listed under IT basics and Internet were considered important by medical librarians in India and Iran. Further, Iranian LIS professionals’ IT skills requirement was higher than that of Indian LIS professionals. A majority of medical librarians from India and Iran needed ICT training to develop their IT skills. It was found that lack of policy for training as the major constraint and lack of interest as a minor constraint to ICT training among Indian and Iranian medical librarians. ‘Self-study’ and ‘Attending workshops/seminars’ were the most popular modes of learning and updating knowledge and skills of IT among medical librarians from India and Iran, respectively.

### 3.3 Impact of ICT on Productivity

Review of studies on IT productivity shows that there are several studies which have analyzed the impact of ICT on macro and micro level productivity. Moreover, fewer studies evaluate people’s perceptions about impact of ICT on productivity. Thus, this review is presented in two parts, viz. ICT productivity at macro and micro level; and people’s perceptions about Impact of ICT on productivity.

#### 3.3.1 ICT Productivity at Macro and Micro Level

According to Hannula and Ionnqvist (2002), productivity can be approached at different levels. The measurement levels can be roughly categorized into macro and micro level. Macro level includes international, national economy, and industrial levels, while micro level includes the firm level and all the levels...
below it. Moreover, productivity measurement is usually kept more quantity oriented than quality oriented.

Brynjolfsson and Yang (1996) reviewed more than 150 articles regarding IT productivity at Industry-level, firm-level, service sector, etc. The authors opined that the relationship between ICT and productivity has become a source of debate. In the 1980s and early 1990s, empirical research generally did not find significant productivity improvements associated with IT investments. More recently, as new data are identified and new methodologies are applied, several researchers have found evidence that IT is associated not only with improvements in productivity, but also in intermediate measures, consumer surplus\(^1\), and economic growth\(^2\). The authors opined that productivity measurement was not an exact science; the tools were blunt, and the conclusions were not definitive. Thus, while one study showed a negative correlation between total factor productivity\(^3\) and high share of high-tech capital formation during 1968-1986 period (Berndt & Morrison, 1995), another study suggested that computer capital contributes to growth more than ordinary capital (Jorgenson & Stiroh, 1995, as cited in Brynjolfsson & Yang, 1996).

Hitt and Brynjoifsson (1996) studied productivity, business profitability, and consumer surplus, three different measures of information technology value, using recent firm-level data on IT spending by 370 large firms. Their findings indicated that IT had increased productivity and created substantial value for consumers. However, they did not find evidence that these benefits had resulted in supra normal business profitability.

\(^1\) “Consumer Surplus” is the amount that consumers benefit by being able to purchase a product for a price that is less than the most that they would be willing to pay (Wikipedia, 2010).

\(^2\) “Economic Growth” is the increase of per capita gross domestic product (GDP) or other measure of aggregate income. It is often measured as the rate of change in real GDP. Economic growth refers only to the quantity of goods and services produced (Wikipedia, 2010).

\(^3\) “Total Factor Productivity” (TFP) (also called multifactor productivity) is defined as the ratio of output to all inputs used in the production process (Sharpe, 2006).
McCune (1998) compiled some themes from research and practice regarding how computers affected productivity. These can also be used as guidelines for using the Internet to increase productivity:

- True productivity increase is achieved not by trying to make small improvements, but when companies reinvent the way they work.
- Technological improvement should be seen as a continuous process, not as a one-time project.
- Technology should be used as a tool to build better relationships with partners.
- Computers improve productivity through quality, rather than quantity, of work.

McCune (1998) has also compiled some pitfalls in technology that may affect productivity negatively:

- Computers, especially the Internet, contribute to information overload.
- Use of e-mail has created very high expectations of getting an almost instant reply.
- Learning new technologies and computer software takes time.
- Technological advancements may make the product too advanced, i.e., too many features make the product too complicated and thus harder to use.

In their article entitled “How the internet affects productivity”, Hannula and Ionnqvist (2002) state that there have been a lot of conflicting research results on the effects of Internet on productivity. Some researchers have not found any evidence that would support the idea that use of the Internet increases productivity. They concluded that the use of the Internet may or may not increase productivity depending on the way it is used. It seems that the greatest productivity improvements are obtained when the Internet is used to create entirely new business models. New business models can provide better value for
the customer in addition to cost reductions. This is in line with the fact that new technology as such does not guarantee competitive advantage because any competitor can achieve it. New technology like Internet – or any other information technology – must be seen as an enabler which can be applied to implement new business processes and models which give true competitive advantage.

Gera and Gu (2004) found that the firms that adopt organizational changes and introduce ICT have a higher incidence of productivity improvement and higher rates of innovation. The firms that combine high levels of ICT and high levels of human capital have a higher incidence of productivity improvement and higher rates of innovation in this sector.

Zimmermann and Finger (2005) believe that the use of ICTs – in comparison to manual work – reduces mistakes and leads to an optimization of the stakeholder (client) benefit through proximity and online-services, as well as to administration-internal knowledge optimization (knowledge management/knowledge sharing). Generally, ICTs do not only digitize existing processes (e.g., from paper based to web based transactions), but also transform processes or even lead to the creation of new processes. Furthermore, the authors remark that tangible benefits resulting from the use of ICTs such as increased cash flows, increased productivity, lower operational costs, reduced workforce, lower expenses and lower facility costs.

In their article, Pouyioutas, Poveda, and Kalogerou (2005) presented an Intercollege Intranet and claimed that the Intranet had a direct impact on the improvement of the teaching and learning environment of the College. As far as faculty members were concerned, the Intranet had automated some tedious and time consuming administrative tasks (e.g., recording of grades) and shifted some others to students (e.g., registration), thus allowing faculty members to spend and utilize the time saved on teaching and research. As far as students were concerned,
the Intranet had eliminated physical and time barriers for educational transactions. Moreover, it had provided students with facilities that helped them become more independent learners (e.g., on-line registration).

Kamuzora (2006) state that the benefits from ICTs to productivity can be categorized as tangible and intangible. The tangible benefits include the following:

• Reduced cost
• Improved productivity (i.e., amount of output produced per unit of input)
• Increased market share
• Savings in labor
• Increased consumer surplus (i.e., the accumulated difference between consumer demand and market price)
• Improved customer service quality
• Improved organizational efficiency
• Quicker response to customers
• Deeper knowledge and understanding of customers

On the other hand, the intangible benefits include:

• Improved decision-making ability
• Superior product quality
• Knowledge/information management and sharing
• Improved coordination/relationships with partners
• Other forms of competitive advantages.

Kamuzora (2006) demonstrated that ICTs have the potential of increasing human resource productivity. ICTs can also transform a firm's relations with its customers, providing increased scope to tailor products to individual requirements. In addition, ICTs provide enormous potential for enhancing productivity of human resources in both public and private sectors. However, net returns on ICTs capital have been observed to be higher in many of the developed countries than in
developing countries. This is because ICTs have enhanced productivity and competitiveness in various organizational processes including management of human resources in both public and public sectors.

Koellinger (2006) believed that although measurement problems and a debate about the sustainability of ICT-enabled productivity growth remain, there is now a growing consensus that ICT does have positive effects on labor productivity\(^1\). However, the effects vary greatly between firms, sectors and countries. In addition, evidence shows that ICT-related productivity increases are primarily observed in those sectors that have invested heavily in the usage of ICT, including trade, financial services, business services, and the ICT manufacturing sectors themselves.

Sharp (2006) studied the relationship between ICT and productivity in the Canadian economy. In this report he provides a detailed overview of ICT investment and capital by ICT component (computers, communications equipment, and software), and ICT investment and capital stock per worker by ICT component in Canada for the total economy and for 20 NAICS industries, focusing on trends over the 1980-2005 period. The key conclusion of the report is that ICT has been the driving force behind the acceleration of productivity growth in Canada and the United States since 1996. However, the potential of ICT has not been fully exploited. The role for government is to develop appropriate policy frameworks so that the productivity enhancing effects of ICT can be fully realized.

According to Okereke (2009), the use of ICTs benefits productivity through the creation of models for turning inputs into products and/or services. As organizations learn and adapt to new technologies, labor can be redeployed to more efficient tasks, discrete components of a new system can be better coordinated, and raw information can be more effectively manipulated to assist

\(^1\) “Labor Productivity” is defined as the ratio of real output, measured as either value added or gross output, to labor input, measured as either hours worked or persons employed (Sharpe, 2006).
decision making. This in turn results in more innovation, leading to a ‘virtuous cycle’ in which the initial adoption to new technologies snowballs into increased profits at the firm level and beyond.

Breeding (2010) stated that organizations of all types are often able to lower their operational expenses through improved automation infrastructure. The entire history of automation involves creating ways to help libraries operate more efficiently, increasing the productivity of each person in the organization.

3.3.2 People’s Perceptions about Impact of ICT on Productivity

According to Hitt and Brynjolfsson (1996), concerns about ICT “productivity paradox” were raised in the late 1980s. The productivity paradox is a theory that suggests investments in ICT do not necessarily lead to associated gains in the productivity of the organization. Therefore, Povlich (2003) undertook a research to answer some of the underlying questions relating to the perceptions held about the relationship between IT expenditures and workplace productivity with respect to Air Force communication squadrons. Both commanders and maintainers felt that procurement and administrative changes had been made in IT planning due to the understanding of a potential IT productivity paradox. Ultimately, the Air Force work centers had the perception that they were getting and adequate return on investment for IT expenditures, indicating that their IT planning procedures had been effective. The results also indicated that they had a perceived need for newer technologies to be able to keep their network infrastructures to the necessary level to support their customer’s needs.

According to a survey conducted in 1995, 70% of U.S. managers felt that using the Internet increases labor productivity, while 15% felt that it decreases labor productivity (Hayes, 1995).

A survey conducted by the Confederation of Finnish Industry and Employers, showed that 80% of the Finnish industrial companies felt that the use
of e-business increase customer satisfaction and more than two thirds stated that their productivity and profitability have risen as a result of e-commerce (Teollisuus ja Työnantajat, 2000, as cited in Hayes, 1995)

In a questionnaire survey, Oladapo (2006) examined the current state of ICT in professional practice in the Nigerian *construction industry* in the context of a developing economy. It was found that the impact of ICT on professional practice had been mainly in making jobs easier for the professions, *facilitating decision–making* and *saving in operation cost*, among others (saving time, improving public image of users, and enhancing productivity).

Abu Samah, Mohammed Shaffril, Hassan, and Abu Hassan (2009) opined that ICT usage has become more relevant in the modern days and agriculture is one of the sectors that benefited from it. Moreover, ICT without doubt is one of the main instruments in doubling agriculture productivity and agriculture community must be encouraged to utilize it widely. In a survey, Abu Samah et al. (2009) tended to know the perception of Malaysia agro-based entrepreneurs towards the contribution of ICT to their agro-business productivity. It was found that the respondents perceived moderate to high level of contribution of ICT towards their agro-based productivity. Result of the study also highlighted two variables (age & electronic media usage) that significantly influence perceived ICT contribution towards agro-based productivity.

Farquharson (2009) examined information technology *productivity paradox* in the context of small private colleges. A qualitative phenomenological research design was used to explore and understand the live experiences and *perceptions* of 21 faculty members and professional staff. The study participants identified that information technology investment was imperative and had positive impact on their productivity, but room for significant improvement in productivity remains. Communication between leaders and end-users was found by participants to be a
key in information technology implementation and productivity improvement. Based on the lived experiences and perceptions of faculty and staff, the Information Technology Productivity Paradox exists in some measure.

Karadag and Dumanoglu (2009) examined productivity and competency of information technology in upscale hotels from the perspective of hotel managers in Turkey. The findings of this questionnaire survey showed that hotel managers viewed guest-related IT applications as highly productive and appreciated IT’s benefits. It seemed there was a strong relationship between guest-related IT applications and productivity in the lodging industry. The results revealed that hotel managers viewed guest-related IT applications as highly productive applications and strongly believed technology improved service quality, and manager/employee productivity.

3.4 Impact of ICT on Performance

A literature search reveals that there are several studies which have analyzed the impact of ICT on performance of different organizations such as firms, banks, schools, etc. Further, some studies investigate people’s perceptions in this regard. Therefore, this review is presented in two parts, viz., impact of ICT on performance of different organizations; and people’s perceptions about Impact of ICT on performance.

3.4.1 Impact of ICT on Performance of Different Organizations

Wong and Ngin (1997) studied the impact of production automation on organizational performance in 52 electronics manufacturing firms in Singapore. Four dimensions of organizational performance were identified: Operational performance, labor management effectiveness, workers' well-being and remuneration. On the whole, automation was perceived to have resulted in greater improvements in operational performance and worker's well-being than in labor management effectiveness and workers' remuneration. However, there was
significant positive correlations among all four dimensions of organizational performance.

Bharadwaj, Bharadwaj and Konsynski (1999) used Tobin's q, a financial market-based measure of firm performance, and examined the association between IT investments and firm q values, after controlling for a variety of industry factors and firm-specific variables. The results indicated that, in all of the five years, the inclusion of the IT expenditure variable in the model increased the variance explained in q significantly. The results also showed that, for all five years, IT investments had a significantly positive association with Tobin's q value. Their results were consistent with the notion that IT contributes to a firm's future performance potential, which a forward-looking measure such as the q was better able to capture.

Pisapia, Knutson and Coukos (1999) studied the impact of computers on student performance and teacher behavior. Data were collected through teacher survey and standardized test scores. It was found that student achievement could be influenced by the appropriate integration of computer technologies into instruction. Students with access to computer-aided instruction had increased standardized reading test scores. Teachers perceived that their ability to integrate technology into their instruction and their teaching behaviors were positively impacted by the computer technology. They also concluded that teachers’ ability to integrate technology-assisted instruction into their classroom routines could be influenced by staff development and technology support.

El-Mashaleh, O’Brien and Minchin (2006) examined the impact of IT on construction firm performance based on data collected from 74 construction firms in the USA. Analysis provided empirical evidence that IT was positively associated with firm performance, schedule performance, and cost performance.
No relationship was found between IT use and customer satisfaction, and profitability.

### 3.4.2 People’s Perceptions about Impact of ICT on Performance

Zuboff (1988) (as cited in Horsfall, 1992) believes that the capacity of information technology to generate vast amounts of information about the underlying processes of production and administration, allows employers to informate their work force so that employees can *do their jobs better*.

Forester (1989) (as cited in Horsfall, 1992) states that information technology allows the employers to automate the workplace by using the technology as a fail-safe mechanism to monitor and *increase certainty* and *control over production* and *the organizational functions*.

According to Horsfall (1992), studies of office, industrial, and *library* automation report that automation has the greatest impact on staff in the lower levels of the organization where the work is routine; and less impact at the top where authority and decision making are concentrated. Reviewing the literature, the author concluded that the positive effects of automation were: *A reduction in repetitive work and tedious procedures; an increase in skill level; possibly higher job satisfaction; an increase in the variety of tasks; and greater flexibility*. At its worse, the impact of automation on employees especially lower level employees, could result in: The degradation of the quality of working life; the *decline in interpersonal communication and client relations; an increase of employee stress, depersonalization, and boredom; lower job-satisfaction; and the loss of control over the pace of one's work and organizational functions; and lower self-esteem and staff morale*.

Horsfall (1992) carried out a study at a campus *library* of a multi-campus tertiary institution over the course of 16 months, when the library implemented an integrated turnkey automated system. The system replaced the library's manual
systems - catalogue, circulation, holds, and reserve loans - thereby dramatically changing the work of some of the library staff. The librarians reported that they had acquired new skills from automation which supplemented their skills in the library; and that automation had replaced a number of tedious and repetitious tasks and increased the variety, challenge and interest in their work. However, the impact of the automated system on the support staff was completely the opposite to that of the support staff.

According to Geleijnse (1994), library automation has an impact on job security, job satisfaction, the quality of the job and on cooperation between members of different divisions or branches. Automation can have positive effects on staff by reducing repetitive work, upgrading the skills of the employees, increasing the variety of tasks. Automation can also have negative effects because automation can be used to “deskill” jobs (a decrease in the amount of original cataloging), automation can eliminate jobs (without automation more staff would be required in acquisition, cataloging, etc.), automation can create stress when there is uncertainty about what is going on, for instance, when there are no written personnel plans and procedures when automation is initiated.

Tiamiyu (2000) assessed the perceptions of personnel of Nigerian federal public agencies about obstacles to IT use, the impact of computers on agency departments and tasks and about approaches to IT human resource development. The survey revealed that due to either lack of computing technologies in most of the agencies or of their ineffective exploitation, the majority of the personnel were, as recently as 1997, still unaware of, or unimpressed by, the productivity potentials of using computers in their agencies. However, they were eager for exposure to computer applications in their work. They also preferred informal and work-related training formats which, in their view, should most appropriately begin with middle-level personnel in the agencies. These and other perceptions suggested that most Nigerian public agencies were in the pre-computing, or very
early, stages of the computing culture, hence their focus was more on understanding how to use computers to perform traditional and internal data processing chores than on providing strategic and client-targeted services.

Bailey et al. (2004) investigated the teachers’ perception about use of ICT to address teacher workload through a questionnaire. It was found that ICT did help to address workload for some teachers, especially those who were confident in using it. Key benefits for teachers included better management, storage, and maintenance of work. Saved time was typically ‘reinvested’ in other tasks principally related to teaching, such as lesson preparation, which teachers perceive had resulted in higher quality teaching and learning. However, in some cases, teachers felt ICT increased their workload, with some tasks taking longer to complete. This could often be traced to one or more of: a lack confidence or lack of ICT skills, an ICT strategy that lacks a focus on addressing workload, ineffective networks or a lack of appropriate training or technical support.

Koellinger (2006) pointed out that the key to understanding the impacts of ICT on performance is to view ICT as an enabler of innovation. This conceptualization of new technologies as possible enablers of innovation allows a market-based approach to study the relationship between ICT and performance. Innovation is a strategic variable because it allows firms to differentiate their products, services and production processes vis-à-vis their competitors, at least in the short run.

Vishala and Bhandi (2008) examined the impact of e-journals on the library staff in university libraries of Karnataka. The questionnaire-based survey showed that all librarians agreed that it had “upgraded knowledge and skill”, “Increased job satisfaction”, “improved competence and performance”, and also made “it mandatory to learn to use modern technologies”. Half of the respondents agreed that “it had improved status”, “offered new challenges and better opportunities for
professional growth”, “it had increased the morale and motivation” and it had also added *more responsibility to work*. Further, 50% of respondents disagreed with the statement that “it had reduced *workload*”.

Maldeni and Jayasena (2009) provided an analysis on the relationship between ICT usage and overall performance of *bank* branches done from a perspective of a leading commercial bank in Sri Lanka. Most of the banks in Sri Lanka are geared for comprehensive banking solutions with extensive branch networks. Perceptions of branch managers, staff members and customers were collected using a survey method. The analysis revealed that ICT usage had a positive linear relationship with financial performance and quality performance of bank branches. Bank branch performance was found to have a correlation with factors such as staff attitude towards ICT usage, ICT literacy level of branch staff and scope and complexity of the ICT applications.

Adejola (2010) carried out a study to ascertain the actual impact of ICT investments on corporate performance in African *banks* using questionnaire and observation. The author equally used secondary information such as annual statements of accounts of the sampled banks to determine the performance of the banks via such performance measures as net income against the various investments of banks, which included ICT investments, investments in non-ICT labor and other investments for a period of ten years. The study revealed that ICT investments did not contribute significantly to the profitability of Nigerian banks and ICT related problems influenced the performance of Nigerian banks.

Safahieh and Asemi (2010) opined that with the advent of modern technologies and their applications in day-to-day activities of *libraries* such as acquisition, cataloguing, circulation, indexing and administrative, manual routines have transformed into computer manipulated tasks. The computer provides
flexibility, speed and accuracy, and it enhances effectiveness and efficiency of library’s routine work.

3.5 Impact of ICT on Job Satisfaction

Researchers across disciplines have written countless articles concerning the job satisfaction of their field’s practitioners. Authors have borrowed from psychology, business administration, human resources management, and the wide umbrella of organizational science to define, measure, and interpret the significance of job satisfaction in their discipline (Murray, 1999).

Korunka and Vitouch (1999) believed that “the introduction of ICT has a remarkable positive as well as negative potential for causing changes in job satisfaction. Numerous studies have attempted to evaluate these effects. In the 1970s and 1980s, most studies focused on the effects of visual display units (VDUs). Work with VDUs has been shown to be accompanied by an increase in eye complaints and musculoskeletal complaints. Compared to control groups working with conventional technologies, a higher level of job stress was found in most of the cross-sectional studies investigating the effects of computerized office work. Working time with the VDU, ergonomic deficiencies in the hardware, and software were found to be relevant stressors by the researchers” (p. 341).

Carey (1992) explored the relationship between job satisfaction and the daily usage of visual display units (VDUs). A negative correlation was found to exist between job satisfaction and utilization of the VDU. Workers who had utilized the VDU alone for data entry were more satisfied with their jobs than those workers who had used the key punch for data entry and then switched to the VDU, although they said they preferred the VDU over the key punch.

The national Research Council reviewed research on the effects of technology on the quality of work and concluded that workers who used information technology were generally satisfied with it, because it allowed them to
do their work better and because it improved the jobs themselves or, at a minimum, didn’t degrade them significantly (Hartmann, 1986, as cited in Estabrook, Bird, & Gilmore, 1990).

In their study, Ang and Soh (1997) investigated how the computer background variables (frequency of use, user training, and computer literacy) affect user information satisfaction (UIS) and job satisfaction in three companies. It was found that none of the user computer-background parameters had any significant effect on job satisfaction. However, Yaverbaum (1988) (as cited in Ang & Soh, 1997) found these variables to be positively correlated to job satisfaction.

The effects on staff of the implementation of new office IT were investigated in ten companies in Vienna, Austria, using a longitudinal design by Korunka and Vitouch (1999). Results suggested that negative effects of IT implementations must be expected if such advancements do not include the enhancement of employee qualifications, which in turn contributes to job satisfaction.

Black and Lynch (2001) (as cited in Hector, Gibson, & Zorn, 2009) believe that new ICT is a feature of the last 30 years, and from its earliest days it has been associated with speculation about its likely effects on the workforce. Numerous studies from around the more advanced economies have established that new technology is associated with generally higher wages, with rising wage dispersion, and with an increasing skills premium (Freeman, 2002, as cited in Hector, Gibson, & Zorn, 2009).

Engström, Ljunggren, Lindqvist, and Carlsson (2005) measured staff members' satisfaction with their work before and after increased information technology (IT) support in dementia care. Results showed that staff members' job satisfaction and perceived quality of care improved in comparison with the control group. Personal development, workload, expectations and demands, internal
motivation and documentation as well as the total scores for "psychosocial aspects of job satisfaction" increased in the experimental group. Moreover, the study showed that IT support in dementia care increased staff members' satisfaction with their work in several ways.

Danziger and Dunkle (2005) examined the determinants of job satisfaction of workers who used computers on a regular basis. While job satisfaction was positively associated with feelings of autonomy and influence on the job and with coworkers, job satisfaction decreased with an increase in the number of hours the worker was directly using the computer. They stated that the ‘reason’ for the lowering of job satisfaction might be the result of too little interpersonal relationships.

Nathalie, Ludivine, and Thierry (2008) evaluated the effects of the use of cell phones, computers and the Internet on job satisfaction. They used a survey conducted by the French National Statistic Institute in October 2005 on standards of living in French households. The results showed that these three technologies had complementary and globally positive impacts on job satisfaction, especially the computer. As for the cell phone, it had ambivalent effects, as it was also a source of stress for the employee.

In their study, Hector, Gibson, and Zorn (2009), workers in enterprises with new ICT were generally more satisfied with their pay, their job security, the variety in their tasks, and with the growth and development opportunities. They felt more valued and overall they were more satisfied in their work.

Attar and Sweiss (2010) attempted to provide a basis for understanding the perception of IT adoption and its relationship with job satisfaction for employees working in Jordanian contracting firms. Results revealed that there was a significant relationship between IT adoption dimensions and intrinsic, extrinsic and general dimensions of employee job satisfaction. These findings led to the fact
that the more IT investment incurred in an organization, the more satisfied its employees would be with their working conditions, their relationships with coworkers and personal job characteristics such as creativity, ability, responsibility, social status etc. Moreover, IT adoption levels affected the level employees were satisfied with their supervisors, company policy, compensation and recognition.

3.5.1 Job Satisfaction of Library Staff

Research on job satisfaction in the library staff dates back to the 1970s and a significant body of literature has been created concerning job satisfaction in the field of librarianship. Here, some of them are presented.

In a general satisfaction survey of one hundred librarians of Lucknow City, Chopra (1984) found that librarians derived satisfaction from their work, social recognition received, working conditions, job security, and social status. Sources of dissatisfaction were from avenues for promotion, behavior, and pay scales.

Nzotta (1987) categorized library personnel into three groups by their functions-public services, technical services and management- and compared levels of job satisfaction between these groups. Factors which correlate with job satisfaction or dissatisfaction were identified.

Leckie and Brett (1997) investigated job satisfaction of Canadian university librarians, using a replication of a 1993 American study to facilitate international comparisons. Although faculty-academic status librarians were significantly more satisfied with their involvement in university affairs and promotion and tenure processes, they were not more satisfied with other dimensions of their work, such as workload and salary. Administrative librarians, on the other hand, were significantly more satisfied with most of the major aspects of work being measured, and perceived themselves to be much more involved in library planning and university affairs than did no administrative librarians.
In her study on job satisfaction of librarians in academic libraries in Iran, Bagheri (2000) found that satisfaction of librarians in most areas, except human relations, was at a medium level. There was a significant relation between job satisfaction and factors such as physical facilities, educational programs provided, managerial style, human relations condition, educational background, social status and working in technical section of the libraries.

Togia, Koustelios, and Tsigilis (2004) investigated job satisfaction among academic librarians in Greece, using the Employee Satisfaction Inventory (ESI). The instrument assessed six dimensions of job satisfaction: working conditions, pay, promotion, job itself, supervision, and organization as a whole. Greek academic librarians were most satisfied with job itself, supervision, and working conditions and less satisfied with pay and promotion. Prior working experience contributed negatively to the prediction of satisfaction with working conditions, supervision, and organization as a whole, whereas participation in decision-making positively influenced job itself and organization as a whole.

Sook (2007) examined the characteristics of library information technology (IT) workers using a mail survey. The IT workers showed a moderate level of a sense of belonging, playing the broker's role, job autonomy, and job satisfaction. There were differences between librarian IT workers and non-librarian IT workers regarding most of these characteristics.

Eva and McCormack (2009) surveyed law library workers across Canada in an attempt to discover whether they were satisfied with their jobs, and to compare these findings to previous surveys of those working in other types of libraries. Findings indicated that while law library workers were generally quite satisfied with their work, issues affecting job satisfaction included salary, stress, and opportunities for advancement.
Hariri and Ashrafi Rizi (2009) studied job satisfaction among librarians of Iranian public libraries in the capital cities of Iran. Finding showed that job satisfaction as measured by the sum of 27 variables in 6 dimensions was less than the average. Regarding the six dimensions, job satisfaction as measured by physical and welfare facilities, job security, stability of tenure, self actualization and the work itself were lower than the average and job satisfaction measured by managers’ behavior and human relations were more than the average. It was also found that there was no significant difference between job satisfaction of librarians with different field of studies (Library and information Science/other fields).

Hart (2010) carried out a study on job satisfaction at a South African university library. The study found a "love-hate" relationship between respondents and their work. The key positive finding was that 61% reported overall job satisfaction. However, only 51% claimed to be proud to work at their library and 50% were open to other job offers. Causes for the restlessness included a sense of stagnation, frustration with inadequate resources, and anger at poor remuneration.

3.5.2 Impact of ICT on Library Staff Job Satisfaction

Beginning around the mid-1980s, job satisfaction studies in libraries began to examine the relationships between job satisfaction and other interventions, including continuing education needs, automation, unionization, performance and job responsibilities (Thornton, 2000).

Lynch and Verdin (1987) performed an excellent study of three large academic libraries in 1971-72 and replicated it in 1986. Little automation existed at the time of their first study, while by 1986, the libraries were largely automated. In both studies, they found that reference personnel reported significantly higher levels of job satisfaction than people working in other areas. In the replication, reference personnel were actually slightly more satisfied than they had been fifteen years earlier. Circulation personnel were significantly more satisfied than
they had been fifteen years before. Lynch speculated that this could be attributed to the automation of routine work.

A study of support staff in three libraries by Jones (1989) (as cited in Estabrook, Bird, & Gilmore, 1990) showed that a majority of respondents felt working with computer made their job easier and cited more positive than negative reactions to automation.

Estabrook, Bird, and Gilmore (1990) examined job satisfaction among professional and support staff members in four academic libraries. It looked at (i) the factors that contributed significantly to job satisfaction, (ii) whether use of technology is related significantly to job satisfaction. They concluded that professionals had a higher mean satisfaction level than support staff and librarians reported spending significantly less time using the computer. That was a reflection of the way in which libraries implemented new technologies: support operations such as cataloging and circulation were the two computerized processes in almost all those libraries. They stated that in an automated workplace, services were integrated, information transfer occurred more quickly, and limitation of time and space decreased. Moreover, they concluded that individual sources of job satisfaction appeared to have remained constant at a time when work was becoming increasingly automated. Positive sources of satisfaction were found to be independence, autonomy, working with the public, and interaction with co-workers.

Whitlach (1990) studied automation and job satisfaction among reference librarians. It was found that automation did not appear to influence reference employee satisfaction.

Horsfall (1992) carried out a study at a campus library over the course of 16 months, when the library implemented an integrated turnkey automated system. Results from the Job Descriptive Index (JDI) for both support staff and librarians
showed that before automation, job satisfaction was balanced, that was neither positive nor negative. Further, support staff job satisfaction was significantly lower than before automation. While, there was no significant difference in librarians’ job satisfaction before and after automation. Moreover, self-esteem for support staff was lower than before automation, although librarians' self-esteem remained high. In addition, support staff reported that staff-client relations had declined, while librarian-client relations improved after automation. Before automation most support staff believed that the autonomy and control they had over their work was about standard. However, most support staff felt that they had less autonomy and control over their work after automation.

In the UK, Edwards et al. (1995) carried out a survey to establish the impact of electronic information provision on qualified librarians. Their results showed that, although a lack of technical expertise could be very frustrating to the librarians, the use of electronic information increased job satisfaction, confidence, and the efficiency of librarians in their work.

Bii and Wanyama (2001) investigated automation and its impact on the job satisfaction among the staff of the Margaret Thatcher Library (MTL), Moi University, Kenya. It was established that there were myriad problems within the library regarding training and access to automated systems of interest. Most of the MTL staff members associated computers with advancement, prestige, increased IT training, and a complete revolution of the work environment. Furthermore, MTL staff members viewed automation as enrichment and a source of satisfaction with their jobs. For automation to boost the staff members’ job satisfaction, concrete plans for consistent structured in-house training, free access to the available software, additional systems staff, and centralized databases among others must be implemented.
Abbasi (2001) investigated the extent of job satisfaction and the factors which affect it among librarians of Ferdowsi university of Mashhad, Iran. The results showed that there was a significant difference between job satisfaction of the librarians who worked in the libraries which had directors who were library professional and those who were not library professional. Moreover, there was a significant difference between job satisfaction of the librarians who worked with a computer and those who were not using it.

Zimmermann and Finger (2005) believed that there was intangible benefits resulting from the use of ICTs such as organizational flexibility, more timely information, better decisions, organizational learning, employee good-will, job satisfaction, client satisfaction and improved corporate image.

3.6 Summary

This review with chronological order shows that there are some related studies about Information and Communication Technology (ICT) and human resource development, which were presented in five main parts viz., application of ICT; impact of ICT on training; impact of ICT on productivity; impact of ICT on performance; and impact of ICT on job satisfaction. While few studies have evaluated perception of people on impact of ICT on variables such as productivity and performance, however none of them have been done in the field of library.

Further, review of literature shows that, there are some studies, on the application of ICT in libraries, impact of ICT on job satisfaction of library staff and necessity of ICT training for them. While no studies investigated the impact of ICT on library human resource development and related issues (including training, productivity, performance, and job satisfaction of library human resources). To this extent, it is justified that the present study is the first of its kind.

Thus, this chapter gives glimpses of studies on ICT and human resource development both in India and Iran and other countries.