Information and Communication Technology Policy Review Report on Encourage Closer Collaboration between Academia and Industry to Align Curriculum with Market Needs

Mashud Ahmed[a], Abdullah Abusayed Khan[b], S.K.S. Yadav[c*]

[a]Govt. of Bangladesh, Bangladesh Secretariat.
[b]Department of Commerce, Sociology Discipline, Khulna University, Khulna-9208, Bangladesh
E-mail: khanbdnks@yahoo.com, Cell # +88-01716013135
[c]Department of Commerce, Meerut College, Meerut, U.P. India
Email : sudhiryadavmeerut@gmail.com

Abstract

Sharing of knowledge particularly e-knowledge as a factor of production contribute significantly for the socio-economic development and growth of marketability in a country like Bangladesh. ICT plays an indispensable role in promoting openness, accessibility, accountability, connectivity, democracy and decentralization are so essential for effective social, economic, political, academic and commerce and industrial development as well. Through the positive vision, Bangladesh can wake up this giant with effective access of academia, pertinent construction of human resources and perceiving market needs in best possible strategic fashion. Over the last few years, Bangladesh intends to use ICT as the key-driving element for socio-economic as well as e-education and curriculum development. As such Government of Bangladesh is trying to develop the ICT as a thrust sector.

The proper analysis of the national ICT policy of 2002, 2009 and 2015 indicates that appropriate application of these policy frameworks will assist to implement the vision 2021 of government of Bangladesh based on true market needs. The main objectives of the study is to evaluate and find the gap and progress with the effective manner. As findings of the study depicts that national policy of ICT is to create all sorts, appropriate infrastructural facilities and develop human resources enabling development of software industry both by the local and international participation. The study also depicts that educators' perception and the industrial decision makers' perception regarding the necessity of collaboration needed between academia and industry to align curriculum with market needs. Data in the produced graph shows three categories (low, medium and high) of responses. And finally, 50 percent respondents of industrial decision makers have high level of responses for encouraging closer collaboration between academia and industry to align curriculum with market needs, on the contrary, 40 percents of the educator's responses expressed high level of necessity to encourage closer collaboration between academia and industry for aligning curriculum with market needs. Considering various aspects, the ICT policy of Bangladesh has been considered prudent to compare with that of India. As the recommendation can be put forwarded fruitfully overcome the situations. Policy makers should launch into a co-ordinated effort to make this possible and facilitate the growth of the ICT education sector in following positive collaboration with SAARC countries. Moreover, to make the ICT education effective one, starting from the grass root level to higher level co-ordination and needs effective use of e-technology through positive endeavor in considering the real field situation.

Keywords: ICT, e-deducation, collaboration between academia and industry, curriculum with market needs.

*Corresponding Author

1. BACKGROUND AND INTRODUCTION

Information communication technologies (ICTs) are developing rapidly causing tremendous improvement in the productive sectors and industrial leaders depend on the educational system for a qualified workforce as well as for the proficient application of these information technologies. Over the last few years, many nations have taken advantage of the opportunities afforded by ICT within a policy framework, laid down guidelines and preceded with the formulation of a national ICT strategy as a part of the overall national development plan. Bangladesh intends to use ICT as the key-driving element for socio-economic development. Government of Bangladesh is trying to develop the ICT as a thrust sector. Many countries around the world have established organizations for the promotion of ICTs and the increasing technological advances in developed nations will only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas **(Lemke and Baas, 2009)**.

Educators are charged with the task of designing curriculum and training the learners with practical activities that prepare the students for the corporate world. Understanding today's work requirements is essential for both the learners and educators in achieving this goal. At present in Bangladesh, education programs are mainly designed for the future employees in such a way that will help them to perform better in their working environment which is controlled by the industrial experts. But the academic curriculum for preparing these future professionals is designed only by the academia or educators. As a result, a significant gap is created between the learning process of making skilled employees and real life field. In this situation, the closer collaboration between the academic world and industrial experts should be encouraged to fill the gap and for preparing skilled professionals with the market needs. **(Hafiz and Hasan, 2005)**.

Rapid growth in ICT is not possible without massive investments for ICT infrastructure and human resource development through top quality education. Southern states of India, specially Karnataka and Andhra Pradesh, are taken into the examples. The corresponding figures for Dhaka and Bangladesh, although have started to increase recently, are not comparable at all. Human resource development in ICT is not easy and it requires many years of training in the institution of higher education. At present over 550 institutions of higher education in India (163 in Andhara Pradesh alone) offer ICT related program and over fifty thousand graduates. Greater emphasis is also given on English, as it is a communicative tool in the present context of Global scenario. Per capita investment in education in Korea is $170, in Malaysia $150, in India $14, in Pakistan $10 and in Bangladesh it is only $5. It is observed that the educated unemployed youth may become skilled human resources through appropriate training in ICT. **(Kaykobad, 2003)**.

1.1 Objectives of the Study

The main purpose of the study is to be informed about how much fruitful it will be if the objectives of national ICT policy is implemented. However, this study mainly aims to evaluate the academic curriculum of the educational institutions with the market needs of Bangladesh and also to analyze whether closer collaboration between educators and industrial professionals should be encouraged to make the academic curriculum parallel to the market needs.

Specific objectives of the study are given below:

- To know the present status of the ICTs in relation to academia, industries and market needs in Bangladesh;
- To review the ICT policies with infrastructure facilities of the institutes and logistic supports;
- To provide some policy guidelines for effective ICT education and market system of Bangladesh.

1.1.1 Clarification of the Objectives

Before clarifying the objectives, it will be wise enough to make clear some terms with simple definitions which will be very much important to understand the survey objectives.

1.2 Operational Definitions
1.2.1 ICT

ICT stands for Information and Communication Technology and includes any type of software and software related activities, services, and applications including any communication device or application such as radio, television, cellular phones, computer, network hardware and software, satellite systems, video conferencing and distance learning.

1.2.2 Academia

Academia refers mainly to the educational institutions, relevant education department especially universities that are connected with studying and thinking, or the activity of studying.

1.2.3 Industry

Industry is the manufacturing or technically productive enterprises in a particular field, country, region, or economy and is concerned with the production of goods or services within an economy through utilizing the academic knowledge and personal experience.

1.2.4 Relation between Academia and Industry

"Just as castles provided the source of strength for medieval towns, and factories provided prosperity in the industrial age, universities are the source of strength in the knowledge-based economy of the twenty-first century." **(Lord Dearing, September 2002)**

1.3 Methods and Tools

Methods of research for this study report based on primary and secondary sources, thus, included field interview, observations, content/documentary analysis. For this purpose both qualitative and quantitative data were used. Along with these secondary data were incorporated through content analysis, reviewing journal, magazine, newspaper, editorials, periodic/ annual reports on ICTs situation in Bangladesh from concerned government, NGOs,/ organizations and different development partners. Thus, DEO office, Govt. College, and BISIC of Durgapur Upazila in Netrokuna district were selected proportionately through purposive sampling. For interview total sample size was 20 including institutional/ organizational authorities and officials. Unit of analysis were local level concerned ICT stakeholders for this study.
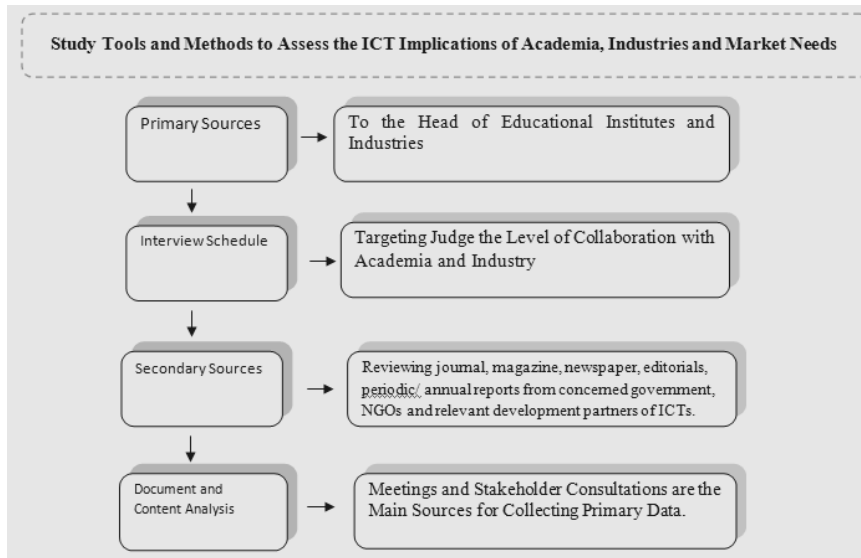
Figure: Tools and methods used for the study

1.4 Limitations of the Study

This endeavor has its own significance in the sense that it has focused a number of important problems related to ICT issues. Hence, the following aspects in view of the several constraints of time, money, paucity of data etc. However, some inadequacy of information relating to occupational pattern and socio-economic condition this is one of the limitations of this study. In addition, when interview and observation took place for the purpose of data collection most of the respondents of the relevant institutions/ organizations in Netrokuna district were not so enthusiastic about responding due to lack of training, skills and political affiliation in these study areas. This may be considered another limitation of the research study. Besides, the study may have some limitations are mentioned below:

- In terms of money and time is essential to conduct any comprehensive study, this may be significant constraint to conduct the study.
- To collect data from the field/ institutional interview needs more personnel. But there was only one hand and bureaucratic problems that limits the collecting of information.
- It was too tough to reach a generalized conclusion by considering small sample size of the respondents as within short period of time.
- The main limitation of the study is that it did with a small area due to time and money constraint. Again, the researcher used purposive sampling procedure to ensure the availability of retrenched ICT related organizations and institutions in the study areas.
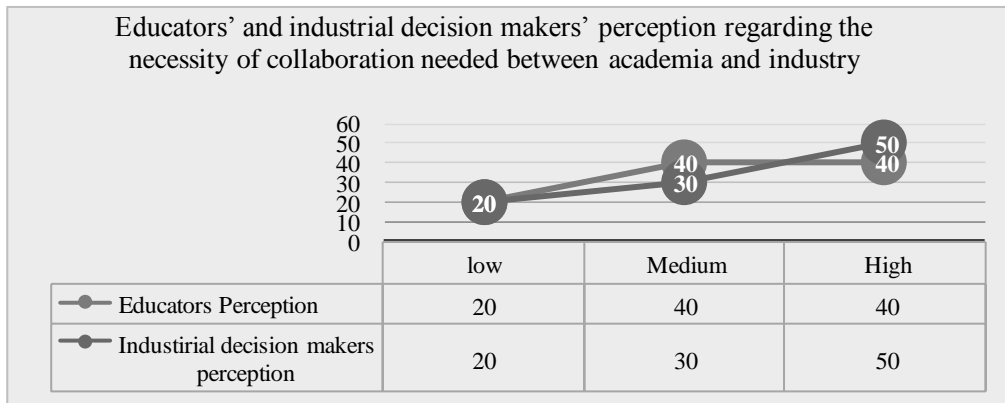
1.5 Time Duration

The research study was conducted during January 2016 and primary data were collected from Durgapur Upazila, Netrokuna District, (January 17-19) in 2016.

2. DATA ANALYSIS AND INTERPRETATION
2.1 Participants' response to the interview questions

The questionnaires were sent to 10 academicians and 10 managing directors and officials of several educational institutions and relevant industries. Durgapur Upazila in Netrokuna district of Bangladesh to assess the status of strategic theme to encourage closer collaboration between academia & industry to align curriculum with market needs. The responses of the academicians and industrialists were collected and analyzed separately. A line chart was used to present the responses.
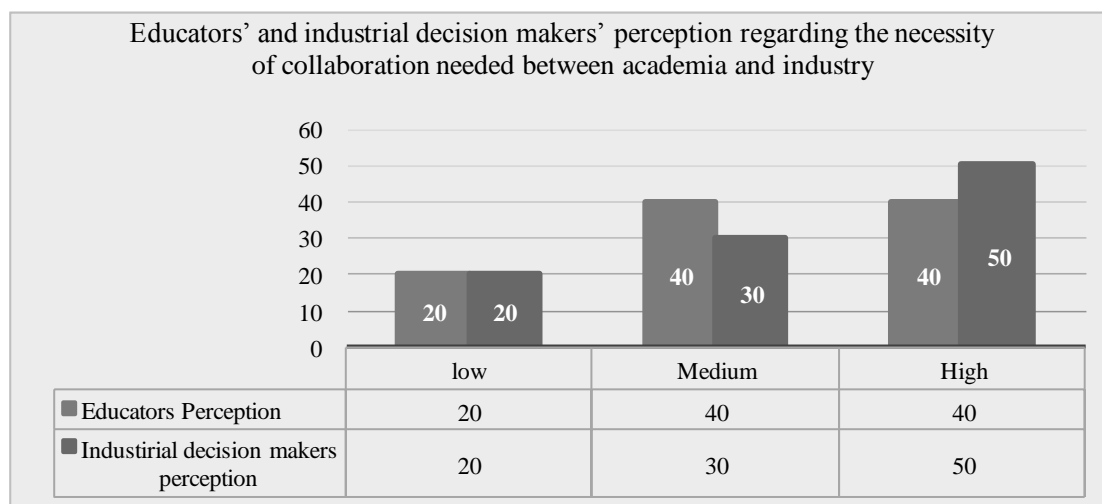
Educators' and industrial decision makers' perception regarding the necessity of collaboration needed between academia and industry			
	low	Medium	High
Educators Perception	20	40	40
Industirial decision makers perception	20	30	50

Source: Field Investigation 2016

The blue axis of the chart symbolizes the educators' perception and the red axis represents the industrial decision makers' perception regarding the necessity of collaboration needed between academia and industry to align curriculum with market needs. Data in the chart shows three categories (low, medium and high) of responses. However, data, in this chart, illustrates that 20 percents of both industrial decision makers and educators perceive the low level of collaboration is required between academia and industry to align curriculum with market needs. Again, 30 percent respondents of the industrial decision makers encourage the medium level of collaboration between academia and industry but 40 percent educators' perception is medium regarding this.

Educators Perception
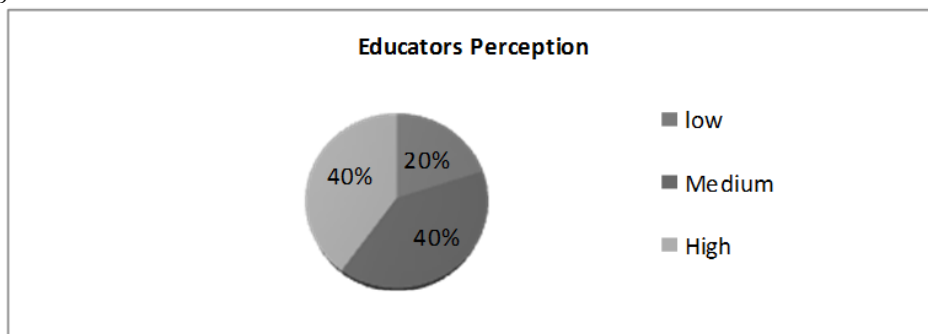
Source: Field Investigation 2016

And finally, 50 percent respondents of industrial decision makers have high level of responses for encouraging closer collaboration between academia and industry to align curriculum with market needs, on the contrary, while 40 percents of the educator's responses expressed high level of necessity to encourage closer collaboration between academia and industry for aligning curriculum with market needs.

Educators' and industrial decision makers' perception regarding the necessity of collaboration needed between academia and industry

	low	Medium	High
■ Educators Perception	20	40	40
■ Industirial decision makers perception	20	30	50

Source: Field Investigation 2016

2.2 Understanding the Survey Questions with the Objectives

Bangladesh is very recently being considered as a lower-middle income country with the Gross National Income per capita (GNI) of $1,046 to $4,125. Yet, the country is not so much advanced in the ICT sectors like the developed and many of the developing countries. For instance, despite China's place as the world's second largest economy and one of the most rapidly growing in the ICT sectors, the Chinese government still classifies itself as a developing country. Therefore, Bangladesh should give much more emphasize in this sector. In accordance with the survey objectives, some topics become mandatory to be analyzed.

Lord Dearing's quotation makes us perceive how much close relation exists between academia and industry. Academia and industry are interdependent to each other in running their activities. The academic activities are mainly designed to make the students fit to conduct industrial activities. One the other hand, the industrial sectors are very much dependent on the graduates from the academia. The given comparisons provide a much precise but easily comprehensible idea about the academia-industry relation:

Medium of Comparison	Academia	Industry
Duties and Responsibilities	One of the major responsibilities of academia is to extend learners' knowledge which will help their professional life.	The chief duty of the industries is profit maximization by employing the most skilled and knowledgeable employees educated from the academia.
Core Competence	The academia exhibits its core competence producing valuable hardware and software through fundamental research.	The core competence of the industries is exhibited by utilizing the hardware and software that are produced in the academia.
Approach	The academia searches and tries to find out the knowledge which is considered to be beneficial to human wellbeing.	The industries decide which knowledge of the academia is beneficial to them and conduct their activities using that knowledge.
Priorities of Topics	The courses of academia are designed according to the priority which different professional fields demand.	The industries choose those professionals who have specified knowledge from the reputed academia according to their demand priority.
Selection of Topics	The academia researchers select those topics for studying which are in present market demand.	The industries learn various management knowledge through the specific knowledge got from the academic research.
Efficiency	The academia makes the learners efficient for adapting with the professional life.	The highly efficient learners are chosen for recruiting in the companies for getting better business outputs.
Culture	Introducing the learners with their culture is one of the prime concerns of the academia.	Cultural knowledge is very much important for the industrial development of any country.
Funding and skilled manpower	Academia funding is mainly for ensuring national development by creating skilled manpower.	Skilled manpower is demanded by the industries to maximize the industrial productivity.
Technology Transfer	The academia provides software and necessary hardware for running the industrial activities.	The industries use the necessary software and hardware provided by the academia.

Source: Herzog C. 2004

The discussion makes it clear that academia and its knowledge are very much important for the industries. On the other hand, industries are very much important for the application of academia knowledge and utilization of skilled manpower from the academia. As these two sectors are interdependent to each other, closer collaboration between academia & industry should be

encouraged to adapt curriculum with market needs. This collaboration will certainly develop the standard of ICT in Bangladesh.

Successful utilization of ICT can be archived with the help of e-technology which is shown in the model shown on next page
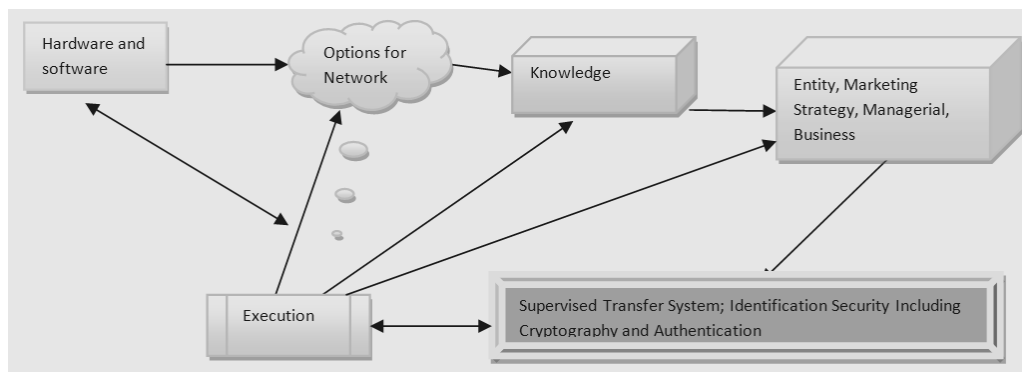

Fig: Successful Utilization Model

2.3 Comparison between the ICT Policies of India and Bangladesh

Considering various aspects, the ICT policy of Bangladesh has been considered prudent to compare with that of India. Again, in contrasting the development status of ICT sectors between Bangladesh and India having several ICT indicators and can predict about the efficiency of ICT policy of them. As per ICT policy formation the Government of India had announced the first ICT policy in May 1999 and revised the policy in 2002, 2005, 2009, and 2012. On the other hand, the first ICT policy of Bangladesh was initiated in 2002 and later it was revised in 2009 incorporating all the components of the National ICT Policy 2002 and latest one published 2015 in Bangla version. India is one of the world-class excellences in a number of science-intensive sectors such as nuclear power, satellite communications and defense as well as software but Bangladesh is not so much highlighted in this aspect. India is becoming a center for innovation utilizing the ICT sectors for multinational companies which have already established around 400 Research and Development (R&D) centers in India to draw on its scientists and engineers. However, in comparison with country size, Bangladesh has fewer innovation centers which are not able to generate enough scientists and engineers who will contribute in the ICT and national development of Bangladesh. India is a newly emerging country in speeding economic growth and achieving faster integration into the world economy while Bangladesh is to struggle to retain her sustainability. India has the indigenous competence for the efficient combination of foreign technology. Indian Government takes required steps to integrate science and technology into all spheres of national activity. The Foreign Direct Investment Confidence Index 2015 conducted by at Kearney reveals that India is the 11th out of the top 25 countries while Bangladesh is ranked 27th out of 42 countries in the Asia–Pacific region. **(CIA, 2013)**. In terms of India is successful enough to support infrastructure for ICT sectors and Bangladesh has been building its infrastructure support for the IT industry over the years. In the sector of freelancing industry the discussed indicators suggest that the position of Bangladesh in the ICT sectors is inferior to that of India.

3. OVERALL SUMMARY AND FINDINGS

3.1 An Overview of ICT Diffusion in Bangladesh

ICT is a combination of physical backbone and intellect. Basically, information –handling tools- a varied set of goods, application and services that are used to produce, store, process, distribute and exchange information. They include the ``old'' ICTs of radio, television and telephone, and the `new' ICTs of computer, satellite and wireless technology and the internet. The trained human behind the backbone are the intellect. These different tools are now able to work together and combating to form ' networked world' a massive infrastructure of interconnected telephone services, standardized computing hardware, the internet, radio and television, which reaches into every corner of the globe. ICT is often categorized into two broad types:

- The traditional computer based technologies;
- The more recent and fast growing range of digital communication technology.

3.2 ICT Profile- Bangladesh

Total Population	138.23 million
Rural population as a percentage of total population	76%
Key economics sectors	Ready-made garments, frozen foods and shrimp, tea, raw jute, and jute products, chemical fertilizer, handicrafts, ceramic products
Literacy in the national language (s)	56%
Computer ownership per 100 inhabitants	0.78[2]
Telephone lines per 100 inhabitants	4.64[3]
Internet hosts per 10,000 inhabitants	0.015 (estimated)
Internet user per 10,000 inhabitants	19.04
Internet cafes/ telecasters per 10,000 inhabitants	0.19 (estimated
Cell phone subscribers per 100 inhabitants	3.91
Number of website in the national language (s)	200 (estimated)
Number of website in English and other language (s)	600 (estimated)
National bandwidth within the country	68 Mbps (data) (estimated)
National bandwidth to and from the country	112 Mbps (estimated)

(Source: UNDP)1. Total Population: 138,226,485. Source: Bangladesh Bureau of Statistics; 2. ITU Estimate, 3.Number of Telephone: Fixed-1,007,450 Cell-5,413,800, Total – 6,421,250 (as on 9 may 2005). Source: Bangladesh Telecommunication Regulatory Commission; 4.The number of website registered with dot bd authority as on 30 April 2005.In Bangladesh, dot bd is not popular. Businesses and government agencies tend to use dot com and dot org domains.

3.3 Digital Divide: Digital divide stems from the separation between those who have access to information and communication technology and those who do not have. Digital divide is very sharp between countries, regions within a country, between sexes and between ethnic groups'. In Bangladesh digital divide persists as social and economic disparity is accompanied with the high cost of bandwidth, lack of proper regulation of resources and heavy mismanagement in ICT

sectors. The country also faces the predicament of inadequate and properly trained technological manpower as well as an unreliable telecommunication infrastructure. Each of the aforementioned reasons behind the divide need separate attention in order to be resolved. This study addresses the issue of the pertaining problems of rural women in ICT facilitation in Bangladesh, what the present situation of IT prevalence is, recommends on how to resolve these problems and forecasts future perspectives based on research done via feedback forms.

3.4 Digital Bangladesh: Broadly speaking, a digital society ensures an ICT driven knowledge-based society where information will be readily available on line and where all possible tasks of the government, semi-government and also private spheres will be processed using the state of the art technology. So, a digital Bangladesh refers efficient and effective use of modern ICT in all spheres of the society with a view to establishing good governance. In other word, making Bangladesh a digital one, we have to establish technology driven e-governance, e-commerce, e-production, e-agriculture, e-health etc. in the society emphasizing the overall development of the common people, the major stakeholders of the country **(Kabir, 2001)**.

"Digital Bangladesh" is currently the most commonly used words in politics, media, among the intellectuals and the civil societies. Since our Prime Minister Sheikh Hasina in her party's election manifesto pledged to develop a digital Bangladesh by 2021, Digital Bangladesh is a continuous process of development. For those who thinks that it can be developed in a specific time and budget is absolutely wrong. The whole process requires lots of tasks, for which we have to be prepared. After all, digitization is the only pathway to economic success, quality education, public health and also generating transparency in governance with full public participation. To materialize the idea of digital Bangladesh, development of countrywide backbone and expected number of human recourses is the basic needs. On the other hand, while mass people are concern, availability, accessibility and affordability must be ensured; otherwise the objective of building a digital Bangladesh could not be achieved properly **(Abbas, M. 2009)**.

3.5 Understanding the Survey Questions with the Objectives: Bangladesh is very recently being considered as a lower-middle income country with the Gross National Income per capita (GNI) of $1,046 to $4,125. Yet, the country is not so much advanced in the ICT sectors like the developed and many of the developing countries. For instance, despite China's place as the world's second largest economy and one of the most rapidly growing in the ICT sectors, the Chinese government still classifies itself as a developing country **(Cogit, 2014)**. Therefore, Bangladesh should give much more emphasize in this sector. In accordance with the survey objectives, some topics become mandatory to be analyzed.

3.6 Role of ICT in Implementing Vision 2021 of Government of Bangladesh: The declaration of 'Digital Bangladesh by 2021' was made in December 12, 2008. Though a date is attached to this agenda, it is interpreted as a long-term vision rather than a target. In many ways, the aim of 'Digital Bangladesh' is the achievement of the dream of Bangabondhu's 'Sonar Bangla' (Golden Bengal). Any kind of technology can be understood as a tool or technique for extending human capacity. In this sense, ICTs extend our human capacity to perceive, understand and communicate with others. The mobile phone enables us to speak with any people of the world; television permits us to see what is happening on the other side of the planet; and the Web

supports immediate access to, and exchange of, information, opinions and shared interests. In the field of formal education, ICTs extend the learner's capacity to perceive, understand and communicate in the classroom. Besides, ICT is a significant enabler to the nation's struggle to achieve the economic, cultural, and social emancipation. From this viewpoint, ICTs and new technologies cause all aspect of national progress succeeding the way of a Digital Bangladesh. The proper analysis of the national ICT policy of 2002 and 2009 indicates that appropriate application of these policy frameworks will assist to properly implement the vision 2021 of government of Bangladesh.

3.7 Effectiveness of Bangladesh Government's Recently Initiated Labor Information Market:
The labor information market is an active labor market policy instrument that collects, evaluates and provides labor market information to both the labor supply side and the labor demand side. The government labour information market will avail:
- the nationwide transparency concerning supply and demand on the markets for labor;
- the fast access to job offers and job requests, acceleration of the matching process by fast access to job offers and job requests for both employers and job-searchers
- the use of all available possibilities to support labor market functions
- the uncomplicated and red-tape-free ways of communicating offers and notices.

However, as a significant number of people of Bangladesh are poor, illiterate, and technologically unskilled, the full launch of labour information market will face enormous complexities and take a great deal of time. Proper evaluation and monitoring of the labor information market by the Bangladesh government are necessary to be taken if the offered services are to reach to the target groups and in target numbers.

3.8 Urgent Need to Change the Curriculum of the Universities as per Market Demand: The collaboration between the academia and the industry in curriculum development at university level may be a very complex issue in my opinion. Besides, the objectives of education in university may also differ from those of the industry. For example, at the university, education may be provided to the students teaching the right values and attitude for work and also providing the fundamental knowledge in the respective specialization but these might not be so much important for some industries at this modern time and practical experience of work, personal efficiency of managing works and so on can be the major issue in those industry. As a result, the combination of general and professional education in university programmes is so much necessary. Industrialists and industry can help academia to keep the curriculum relevant to present market demand and to the recent changes in industry so that graduates can be readily adapted into industry. They can also help to let the Universities know how many graduates they need in a particular area so that graduates would find jobs that are available. Moreover, the collaboration with industry may provide access to the available technology that the university may not have and the university may provide the expertise in research to help address the needs of industry through research and development.

Ideally, we would like to see university programmes able to keep up with the fast changing needs of the industry. But in actual reality, collaboration in curriculum development may be very much complex at undergraduate level in Bangladesh. This may be a challenge at university level as the

faculty may face challenges related to funding and specialized knowledge employed by the industry. So, beside collaboration with industries, it is always good to provide internship programmes to the undergraduate so that they can be aware and experienced with the current development in the industry.

3.9 Urgent Need to Develop ICT Personnel's Professional Skill: Comparing the size of the national population and the size of the national economy, it seems that the ICT industry in Bangladesh is still relatively small. But the more developed ICT industry with more efficient professional skill can take the country to the position of higher development. So, everybody admits that there is an urgent need to develop ICT personnel's professional skill.

3.10 Effectiveness Government's Steps to develop ICT in various departments: The first ICT policy of Bangladesh was initiated in 2002 and later it was revised in 2009 incorporating all the components of the National ICT Policy 2002. Before 2002, the ICT concept of Bangladesh was about concealed but now the country is advancing towards development. So, the steps taken by the government of Bangladesh to develop ICT in various departments is effective enough. But the ICT development is not noticed so much in every sphere in Bangladesh. So, more planned steps will have to taken to ensure the further development of ICT in Bangladesh.

3.11 Necessity of Involving Expatriates in the Field of ICT: The expatriates, specially who go mainly for education purpose, are the most talented portion of people of the country and usually go abroad for getting higher education in the most developed countries of the world. Sometimes, they settle abroad if better job opportunity is availed with better job and salary. So, some selected portions of the expatriates are highly educated and experienced with more developed ICT knowledge and, therefore, it can be benefited for the country to include them in the field of ICT.

3.12 Urgency to Initiate the Expansion of ICT Market Globally: The more advanced ICT industry is a prerequisite for more planned development. The more developed the ICT market of a country is, the more developed position the country holds. If the ICT market can be expanded globally, it will support the more effective export and import trading which will motivate the further advancement of the country.

3.13 Government's imposition of the ICT Subject as Mandatory in Secondary Schools: As the ICT sectors play an important role in the country's development and the ICT sectors can be upgraded mainly by the students, it is wise to insert ICT knowledge among the students form their secondary schools. But it will have to keep in mind the secondary level students' capacity to understand the value of ICT and the syllabus must be developed considering the students' capability.

3.14 Industries' Initiatives for Further Development of ICT: The industries are chiefly and intimately associated with the application of ICT services. So, the industrial professionals and decision makers have far more idea about all aspects of ICT matters. So, they should undertake some initiatives for the further development of ICT for their own shake as well as for the national development. In this respect, the government can form ICT development committee in every division with the educators, social thinkers, technicians, and industrial professionals as well as decision makers.

3.15 Role of ICT in Implementing Vision 2021 of Government of Bangladesh: The declaration of 'Digital Bangladesh by 2021' was made in December 12, 2008. Though a date is attached to this agenda, it is interpreted as a long-term vision rather than a target. In many ways, the aim of 'Digital Bangladesh' is the achievement of the dream of Bangabondhu's 'Sonar Bangla' (Golden Bengal).

Any kind of technology can be understood as a tool or technique for extending human capacity. In this sense, ICTs extend our human capacity to perceive, understand and communicate with others. The mobile phone enables us to speak with any people of the world; television permits us to see what is happening on the other side of the planet; and the Web supports immediate access to, and exchange of, information, opinions and shared interests. In the field of formal education, ICTs extend the learner's capacity to perceive, understand and communicate in the classroom. Besides, ICT is a significant enabler to the nation's struggle to achieve the economic, cultural, and social emancipation. From this viewpoint, ICTs and new technologies cause all aspect of national progress succeeding the way of a Digital Bangladesh. The proper analysis of the national ICT policy of 2002 and 2009 indicates that appropriate application of these policy frameworks will assist to properly implement the vision 2021 of government of Bangladesh.

3.16 Effectiveness of Bangladesh Government's Recently Initiated Labor Information Market: The labor information market is an active labor market policy instrument that collects, evaluates and provides labor market information to both the labor supply side and the labor demand side. The government labour information market will avail-

- the nation-wide transparency concerning supply and demand on the markets for labor;
- the fast access to job offers and job requests, acceleration of the matching process by fast access to job offers and job requests for both employers and job-searchers
- the use of all available possibilities to support labor market functions
- the uncomplicated and red-tape-free ways of communicating offers and notices.

However, as a significant number of people of Bangladesh are poor, illiterate, and technologically unskilled, the full launch of labour information market will face enormous complexities and take a great deal of time. Proper evaluation and monitoring of the labor information market by the Bangladesh government are necessary to be taken if the offered services are to reach to the target groups and in target numbers.

3.17 Urgent Need to Change the Curriculum of the Universities as per Market Demand: The collaboration between the academia and the industry in curriculum development at university level may be a very complex issue in my opinion. Besides, the objectives of education in university may also differ from those of the industry. For example, at the university, education may be provided to the students teaching the right values and attitude for work and also providing the fundamental knowledge in the respective specialization but these might not be so much important for some industries at this modern time and practical experience of work, personal efficiency of managing works and so on can be the major issue in those industry. As a result, the combination of general and professional education in university programmes is so much necessary. Industrialists and industry can help academia to keep the curriculum relevant to present market demand and to the recent changes in industry so that graduates can be readily

adapted into industry. They can also help to let the Universities know how many graduates they need in a particular area so that graduates would find jobs that are available. Moreover, the collaboration with industry may provide access to the available technology that the university may not have and the university may provide the expertise in research to help address the needs of industry through research and development. Ideally, we would like to see university programmes able to keep up with the fast changing needs of the industry. But in actual reality, collaboration in curriculum development may be very much complex at undergraduate level in Bangladesh. This may be a challenge at university level as the faculty may face challenges related to funding and specialized knowledge employed by the industry. So, beside collaboration with industries, it is always good to provide internship programmes to the undergraduate so that they can be aware and experienced with the current development in the industry.

3.18 Urgent Need to Develop ICT Personnel's Professional Skill: Comparing the size of the national population and the size of the national economy, it seems that the ICT industry in Bangladesh is still relatively small. But the more developed ICT industry with more efficient professional skill can take the country to the position of higher development. So, everybody admits that there is an urgent need to develop ICT personnel's professional skill.

3.19 Effectiveness of Government's Steps to Develop ICT in Various Departments: The first ICT policy of Bangladesh was initiated in 2002 and later it was revised in 2009 incorporating all the components of the National ICT Policy 2002. Before 2002, the ICT concept in Bangladesh was about concealed but now the country is advancing towards development. So, the steps taken by the government of Bangladesh to develop ICT in various departments is effective enough. But the ICT development is not noticed so much in every sphere in Bangladesh. So, more planned steps will have to taken to ensure the further development of ICT in Bangladesh.

3.20 Necessity of Involving Expatriates in the Field of ICT: The expatriates, specially who go mainly for education purpose, are the most talented portion of people of the country and usually go abroad for getting higher education in the most developed countries of the world. Sometimes, they settle abroad if better opportunity is availed with better job and salary. So, some selected portions of the expatriates are highly educated and experienced with more developed ICT knowledge and, therefore, it can be benefitted for the country to include them in the field of ICT.

3.21 Urgency to Initiate the Expansion of ICT Market Globally: The more advanced ICT industry is a prerequisite for more planed development. The more developed the ICT market of a country is, the more developed position the country holds. If the ICT market can be expanded globally, it will support the more effective export and import trading which will motivate the further advancement of the country.

3.22 Government's imposition of the ICT Subject as Mandatory in Secondary Schools: As the ICT sectors play an important role in the country's development and the ICT sectors can be upgraded mainly by the students, it is wise to insert ICT knowledge among the students from their secondary schools. But it will have to keep in mind the secondary level students' capacity to understand the value of ICT and the syllabus must be developed considering the students' capability.

3.23 Industries' Initiatives for further Development of ICT: The industries are chiefly and intimately associated with the application of ICT services. So, the industrial professionals and decision makers have far more idea about all aspects of ICT matters. So, they should undertake some initiatives for the further development of ICT for their own shake as well as for the national development. In this respect, the government can form ICT development committee in every division with the educators, social thinkers, technicians, and industrial professionals as well as decision makers.

3.24 Current Status of Cooperation between Academia and Industry: The cooperation between academia and industry is very low in Bangladesh. It is generally noticed that:

- Academics seldom attend industrial conferences as they feel this is below their standard.
- Academics consider their profession as noble and look down upon industrial newspapers and magazines.
- Academics are not aware of the problems and constraints of industry.
- Both Academics and Industrialists are pursing different goals entirely. The Academic is striving for recognition from his or her peers. The Industrialist is striving to survive.
- Industry is mainly concerned with costs. Academia could care less about costs, it is mainly interested in the benefits

4. RECOMMENDATIONS

Following suggestions are made in the light of the results and observations of the study to overcome the situations:

- **Bridging the Gap between Higher Education and the Labour Market:** Today's industries are looking for innovative solutions from the academia to help meet their business needs of higher productivity and lower costs. On the other hand, the graduates from academia are seeking for lucrative jobs with handsome salary in the highly developed businesses and industries.
- **Academia-industry Interaction as the Part of Education:** Academia-industry interaction should be considered as a part of the education so that the future entrepreneurs have conscious knowledge about it.
- **Conducting Undergraduate Thesis on Academia-industry Interaction:** The future entrepreneurs can get pros and cons of academia-industry interaction by conducting undergraduate thesis.
- **Internships:** Every student form commerce and business studies should be given chance of involving in the real business experience through part-time working and formal Internships
- **Industry Team Project: Real World Experience:** At the completion of one's sessional coursework, there should also be final 'Industry Team Project' where students are to solve a real-world problem in industry. An industry sponsor should assign the team project.
- **Industry and Government Research Relationships:** Industrial sectors are the important resources for national development. So, there should have an industry and government research relationships to develop the industrial sectors.
- **Summer Camps:** Summer camps can be arranged in collaboration with the industry to expose the students to various academic and extra-curricular activities. These camps serve as a forum

for the development of overall personality, leadership, organizational skills and exemplary team work which are essential for a successful career besides academic activities.

- **Provision for Entrepreneurial Undertakings:** Students develop new products or processes which are restricted in experiments. Due to non-availability of capital and operational cost, the research is not able to reach the market.
- **Consultancy Services:** Academic institutions can help the industrial companies by providing consultancy services in the form of evaluation of products, processes, software development etc.
- Discovering and exploring interests both academic and future professional interests. Try to socialize the teens to use internet as the purpose of academic and future professional interests;
- Government of the country should disclose their own rules and laws against ICT policy and services. If anyone do not follow those, government should take necessary steps.
- Policy makers should launch into a coordinated effort to make this possible and facilitate the growth of the ICT education sector. And to make the ICT education effective one, starting from the grass root level to higher level coordination and needs effective use of e-technology in the positive endeavor.

5. CONCLUSION

In the formal education sector, more emphasis is laid on increasing skilled manpower to strengthen the ICT industry in the country. For this purpose, most education initiatives focus on providing ICT as a subject at the secondary and higher secondary level. The scope of using ICT as an instructional support to ensure quality education needs to be explored more extensively. Bangladesh does not have any distinct ICT in education policy yet. The imperative to develop a national ICT policy largely comes from recognizing the need to develop adequate human resource to strengthen the ICT market. In reference to education, the National ICT Policy primarily focuses on producing trained ICT professionals by stressing the importance of ICT as a subject in the curriculum. ICT policy of Bangladesh must prepare itself to compete effectively in the global ICT market. As the demand for skilled manpower in ICT is growing worldwide, the country needs to produce a large number of ICT professionals. IT training/education is the least flourishing section. This is abysmal for a country like ours where 'sleeping' manpower is in abundance. Why is the IT education sector lagging behind and what can we do to turn our sleeping manpower into valuable human resource in the ICT sector? These questions are still put forwarded. So in considering the real field situations ICT plays an indispensable role in promoting openness, accessibility, accountability, connectivity, democracy and decentralization are so essential for effective social, economic, and political development. Bangladesh has been declared a 'sleeping giant' in the ICT sector. We can wake up this giant only through effective access of academia, apposite construction of human resources and perceiving market needs in best possible ways.

REFERENCES

[1]. Abdus Sobhan, M. (2001). Policy issues to capacity building of ICT-education in Bangladesh; Presented at the seminar on "Human resource development in Information Technology: Prospects and Problems" organized by east West university, Dhaka.

[2]. Association for Progrssive Coemmunication Women's Networking Support Programme, "Information and Communication Technologies: A Women's Agenda. http://www.gn.apc.org/apcwomen/resources/policy/womenrights.html.

[3]. Atuahene, F. (2011). Re-thinking the Missing Mission of Higher Education: An Anatomy of the Research Challenge of African Universities. *Journal of Asian and African Studies*, 46 (4): 321-341

[4]. Bhattacharjee M. K. (2002). Development Communication as it should be for Rural Development in the 21st Century: The Bangladesh Context, In (ed) `Current Though on Rural Development', Kotbari, Comilla, Bangladesh.

[5]. Blurton, C. (1999). New Directions of ICT-Use in Education. *World Communication and Information Report*, UNESCO

[6]. Chowdhury, J. R. (1989-99). Problems and Prospects of Software Export from Bangladesh; Journal of The Institution of Engineers, Bangladesh (Multidisciplinary); vol. 23 and 24, No. 1 and 2,

[7]. Chowdhury, J. R. (2015). Information Technology in Bangladesh; Proceedings of the International Conference on Computer and Information Technology, Dec 18-20, Dhaka, Bangladesh.

[8]. Chowdhury, N. (2000). Poverty Alleviation and Information/communication Techonology: Towards a Motif for the United Nations ICT Task Force, Grameen Communications, Grameen Bank Group, Dhaka.

[9]. Fedder, J. (2012). Has the university lost its purpose for preparing its students for the future?

[10]. TED Conversations, accessed at January (2016). retrieved from [http://www.ted.com/conversations/9392/has_the_university_lost_it_s_p_3.html]

[11]. Hafiz Md. Hasan Babu (2005). ICT Development and Bangladesh, The Independent, June 7.

[12]. Hanif Bin Azhar, Abdus Sobhan, M., Lutfor Rahman, M. (1997). Research Activities on Information Technology in Bangladesh; Proceedings of the National Conference on Computer and Information Systems, Dhaka, Bangladesh.

[13]. Herzog, C., Lefevre, L., and Pierson, J. M. (2013). Linking Academia and Industry for a Green (IT) Society. Best Poster Award, ICT4S Conference: First International Conference on ICT for Sustainability, Zurich, Switzerland. 2013. <hal-00925645>

[14]. Kabir M. A., (2001). Promised digital Bangladesh and the young generation.

[15]. Karim, M. A. (2010). Digital Bangladesh for good governance. In Bangladesh Development Forum, Bangabandhu International Conference Centre (pp. 15-16)

[16]. Lemke, C. and Bass. D. (2009). 'Motivation in Using Social Network Sites by Romanian Students. A Qualitative Approach', *Journal of Media Research*, pp. 67-74.

[17]. Mike, A. (2002). The development and use of indicators to measure the impact of ICT use in education in the United Kingdom and other European countries, Developing Performance Indicators for ICT in Education. *UNESCO Institute for Information Technology (IITE)*, 43: 62–73

[18]. Munyoki, J., Kibera, F., and Ogutu, M. (2011). Extent to which university-industry linkage exist in Kenya: a study of medium and large manufacturing firms in selected industries in Kenya. *Business Administration and Management*, 1(4): 163-169

[19]. National Curricula and Textbook Board, (1996). Higher Secondary Certificate curricula.

[20]. Perkmann, M. and Walsh, K. (2007). University-industry relationships and open innovation: towards a research agenda. *International Journal of Management reviews*, 9(4): 259-280

[21]. Roknuzzaman, M. (2006). A Survey of Internet Access in a Large Public University in Bangladesh. *International Journal of Education and Development using ICT*: 3(2), accessed at January 08, 2016 retrieved from [http://ijedict.dec.uwi.edu/viewarticle.php?id=195&layout=html]

[22]. Wilson, P. S. T., (2012). A Review of Business–University Collaboration. Monk, C., Norris-Grey, T., and Skingle, D. M. *edt*. 2012