Innovative Technology, Social and Economic Sustainability: Evidence from Pakistan

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ABSTRACT

This paper assesses the development, perspectives and prospects of innovative technology which would be supporting social and economic sustainability in Pakistan. The study specially examines following points: (i) The trend in growth rate of IT industry. (ii) Comparison of growth at the time of beginning and now. It also draws attention on four factors: introduction of IT, its development, policy issues and innovative methods to implement. Study reveals that Pakistan entered into information age in early eighties. Telecommunication and IT in the country is now growing rapidly. Ministry of telecommunication has recently formulated a strategy for promoting IT industry in Pakistan. The real IT industry requires a world class-enabling infrastructure. In spite of so many prevailing confusions the people of Pakistan have vision and good amount of knowledge. Our education system must create an environment that encourages critical debate with positive dissonance. Information economy in the country needs expansion and improvement that lasts us lifetime. The country is still in the realm of conceptual controversies and is not based on our own experiences to support people's expectations and relevant to realities of our times. The over all conclusion is that Pakistan has made a moderate growth in social and economic sustainability during the last 59 years. The trend of IT is going up steadily, but the time wise transformation of knowledge from the beginning till today is sluggish. It is less than 1.0% of our GDP.

Keywords: Innovative Technology, Social and Economic Sustainability, Developing countries,

INTRODUCTION

Let us begin by briefly describing the long-term socio-economic development in industrialized countries like North America, Japan and Europe which depend to a large extent on technological advancements. Innovation in electricity, telephone, radio, automobile and antibiotic has revolutionized life in the first half of twentieth century. The rise of Internet in nineties gave the biggest rise in household income, and biggest drop in poverty. Although Internet is terrific, but by itself it can't power growth. Without cost reduction in medical treatment, it won't be possible to supply efficient health care and without new industries created by innovative companies it will not be possible to produce enough goods and jobs to replace the ongoing industries (Choudhry

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2006). Without a breakthrough in energy production and distribution system, it will not be possible to provide cheap power for industries (Aamir 2006). Another reason to go for strong growth is to expend efforts in research and teaching competence in education at all levels. It has now become clear that schools, colleges and universities are the places where citizens acquire skills necessary to prosper in the fast changing world of today. With more smart people working with new ideas, the rate of innovation moves up very fast (Lodhi 2006).

The US and EU still dominates the world as the most powerful twin turbine of global economy. Transatlantic commerce accounts for sixty eight per cent of the world's trade and investment, worth $2.5 billion in GDP annually and employing some 12 million workers (The Economist, April 22, 2006). While Asia may enjoy the hottest business, but major corporations like, General Electric believes that an expanded Europe offer greater potential for short and medium term profits. The European Union is now the largest pool of purchasing power in the world, even more important than China and India. Much excitement is lurching on the former communist countries of Europe, where cheap and skilled labour has attracted many world-class companies to invest (The Economist, April 12, 2006:7-26). Corporate American companies' stake's in Europe in running about sixty per cent higher than their investment in China, which is $16.6 billion in Europe in 2003 versus $10.3 billion in China (The Economist April 6 2006).

Telecommunication and information technology in Pakistan during the last 25 years is affecting all social structures. Computers are being introduced in an ever-increasing variety of social activities. The diffusion of IT is happening in a completely anarchic manner unchecked by any viable social control. The basic transformations are being imposed on global trading methods, production structures, capital flow and labour market (P&GE. 2006, No.11). This has seriously hampered the scope of further industrialization in Pakistan especially in export, production and services sectors. We in Pakistan have not paid enough and serious attention to employment generation, skill development and welfare aspect of the industry. Most of the policies made so far, are of mechanistic in nature. The country's commercial polices lack a clear strategic vision.

The main objective of paper is to determine the impact of IT growth in social and economic sustainability. The study specially examines following points: (i) The trend in growth rate of IT industry. (ii) Comparison of growth at the time of beginning and now. Objectives are set to test the following hypothesis: (i) The technology has accelerated in a haphazard way to develop knowledge and development of socio-economic conditions. (ii) The introduction of IT has not augmented the development to the desired level on sustainable basis.

CURRENT STATUS OF IT IN PAKISTAN

One of the major problems faced by Pakistan's IT industry is not so good, an image of its performance. This has inhibited potential foreign investors from engaging with Pakistani industry and therefore, thousands of Master's and Bachelor's degree holders in IT are not fully employed (PMR 2004.No. 2). Our IT industry can be classified under the following categories:

(i). The traditional software houses are developing custom-made applications. This is now slowly declining for the reason that they are no longer cost effective, nor viable for a progressive enterprise, although Retsol, Techlogrix and Systems limited are growing in term of employees and performance (P&GE. 2006, No.12:7-26).

(ii). The system integrators, which provide total solutions, are growing with time. Such companies put together the hardware, the data communication infrastructure and the software giving implementation support and training to deliver the business benefits to the customers. Si3, PIFRA, PWC, Sidemen's and Acconture are worth mentioning (PMR. 2004, No.2).

(iii). The Internet services providers (ISPs) growth is rapid, nearly all multinationals are now using channel mechanism to carry out their businesses, whether this be personal computer or a database management system or office automation (ITR 2001).

(iv). The IT enabled outsourcing sector specially the "call centres" which currently employ 2500 individuals in the industry are serving international clients and another 2500 providing services to domestic customers. In this sub-sector the growth is expected to be 60% provided the government provide more marine cable facility in the next 2-5 years (P&GE.2006.No.19)

(v). The legal and medical transcription services have been providing a clinical support service since 2003 with current employment of about 1000 individuals. Other outsourcing services like accounting and engineering design provide a high value addition to their clientele. JGC and Descon have $5.0 million annual revenue and to employee more than 300 highs-ends mechanical engineers (PRMG 2006).

THE GOVERNMNET'S SUPPORT

The telecommunication ministry has recently formulated a strategy for promoting IT industry in Pakistan, significant elements of this strategy are: -

(a). Offering incentives to foreign partners. The multinationals in the past were selling their products in Pakistan without creating research facilities in Pakistan. Microsoft and other international stakeholders are now awarding R & D projects to Pakistani universities to localize their software products (P&GE. 2006. April 14).

(b). Focusing on selected areas for out sourcing in: "Call centres", Accounting, Insurance claim processing, and Mechanical engineering design for auto spare parts and defence industry.

(c). Promotion of "productization" amongst software companies causing a paradigm shift from customized solutions towards the use of pre-packaged software.

(d). Strengthening academic R & D with emphasis on linkages with civil industry and defence production.

(e). Engaging actively with internationally known research and consultancy companies, like Gartner, IDC, Bearing Point and others to enhance credibility of Pakistani IT industry.

(f). Coordination with industry associations like EPB, BOJ, and the PASHA (P&GE.2006. April 22).

The local IT industry requires a world class-enabling infrastructure (FAST Annual Report, 1998). The government is promoting Parks and Incubators across the country. The telecom infrastructure is being modernized to offer broadband access as the backbone for the Internet access to universities, local loops for the development of national Internet content to financial institutions, banks and DFIs, to create friendly environment and investor's confidence to allow technology companies to be listed on the stock exchanges of Pakistan. The key projects to be supported by the government are citizen's online e-commerce network and e-government project training, in area of digital signature Act, copyright Act, Intellectual Property Right and Consumer Protection Act.

An area needing immediate attention by government is IT education (Naim 2002). Training of the trainers will develop good teachers who can teach IT efficiently and effectively, if they themselves are familiar with the latest technological tools and techniques. After September Eleven most of the Pakistani companies have faced difficult times. The opening up of call-centre business has become a source of foreign exchange earning and has opened up lucrative employment opportunities. The government is preparing to give legal cover to electronic transactions. Extension of ATM facility for paying utility bills through Internet will prove low cost per transaction and time saving. The banks need to create awareness about utility bills payment through ATM to general public as a marketing campaign (Naqvi 2002). Pakistan has not been able to create IT impact globally. It was not incorporated in the list of the world economic forum report 2003-2004 on global competitiveness in IT, whereas Bangladesh made its place in the top 80 countries. The introduction of computer technology in the

country occurred in late 1970s, with the establishment of FAST institute at Lahore and Karachi by Bank of Credit and Commerce International (overseas) Limited (FAST Annual Report 1985). But for over one decade the government did not realized the significances of computer science education and did not bother to introduce it at college level.

Dr. Atta-ur-Rehman took the first serious step to boost IT in Pakistan as Federal Minister for Science and Technology in March 2000. Dr. Atta-ur-Rehman brought about IT buzz, but that was short-lived. Today, in 2005 because of the apathy towards the technology with unwelcoming job market for BCS and MCS graduates, the institutes, which invested huge amount in the infrastructure for computer science departments, are now offering engineering technologies, MBA and media management courses in increasing numbers. It appears like a demise of IT education in Pakistan. One would not like to discuss Operation Badar and Operation Ohad (Report. 1990). This hype was rife from 1999 to 2002, and hundred of students got carried away with cheap but false prospect of quick success with lucrative jobs. The project was initiated to give IT education to the masses and to mint money hurriedly but the students' endurance was much beyond sacrifice.

Dr. Atta-ur-Rehman during 2000, very rightly said that if the nation can generate at least 100,000 'High Quality'' IT graduates, we may earn foreign exchange of US $ 3 billion per year. Unfortunately we failed to educate 100,000 'High Quality' IT graduates in Pakistan. We now can see what India has achieved through their IIT's in three decades. Let us be convinced that IT is not about software, hardware and networking, it is about everything that education prepares our upcoming generations through the confidence, competence and sheer dedication and commitment of our teachers and supportive action by the government. Let us all as a nation take resolute steps towards knowledge based education by dissipating uncertainty and bring confidence back in our youths which was so courageously created during 1980s (FAST Annual Report 1987).

INFORMATION SEARCHING COST

We are living in an age where information is a valuable commodity. It can increase consumer's satisfaction, producer's profits, government efficiency and economy of the country. The economics of information tells us about imperfect foresight. It is impossible to be certain of what the future holds as we are facing an overwhelming tide of information. We can talk to virtually anyone on the globe by telephone. We can follow struggle of liberation movements and political resolutions as they unfold on T.V screens. We can use our personal computers to retrieve and process libraries to search for information which in reality is both valuable and costly to acquire. The need for information is unlimited but the resources needed to produce information have alternative uses. The acquisition, processing and dissemination of information take time.

Perhaps the most obvious scarce source is time. Time spent reading books or listening to knowledgeable scholars cannot be used for other activities. Unfortunately we don't have the time to read, watch or listen, because information search is governed by cost and benefits. Information is collected until the cost of searching information is equal to the benefits generated by the information. The most efficient amount of search is somewhere between zero information and complete information. The economics of information search tells us that complete and perfect information can be prohibitively costly. In USA Goggle search engine is still the forerunner with 36.5% of the queries, Yahoo with 35.5% and MSN stands at 15.5% (The Fortune, April, 2005). These big three are investing aggressively in search technology. A number of new starts ups mostly clustered in Silicon Valley and in Seattle offer a new venue of the next frontier of search, where there is no limit to imagination. Still and moving images are being increasingly digitalized and they can be searched with a click. Singingfish can search AOL's video library of 15000 titles, plus million more over the web by looking for their titles (The Fortune, May 2005).

OUR PEOPLE'S VISION

In spite of all prevailing confusion and frustration, the people of Pakistan today do not lack vision and could be seen as stimulating, vibrant, creative and diverse with rich and illustrious past. New knowledge is shaping our people into close knit, collaborative communities. In most instances new ideas are being encouraged in spite of past dogmas and rigid conservatism. Our thinkers believe that creative education is the foundation of enlightenment. Now and in the future the economy will be driven by and depend on creative people. Interaction of people who can think and feel comfortable in taking risks and job endurance. People who can visualize things that do not exist and have the technical and organizational skills to give shape to their dreams. People who are forward-looking and self-motivated are able not only to solve problems but also identify the problems, which need to be solved.

THE AIM OF EDUCATION

Our education must create an environment which is open and supportive, and encourages critical debates with positive dissonance, inspiration, guidance and ability to understand the real knowledge free from all pollutions and misconceptions, which during the last on thousand years has made us dormant and confused and non-enterprising. We must learn the essence of real life-pleasure and improve our living style with friendly and welcoming attitude.

We must have a supportive environment and should recognize that many of our youths need extra support especially in the early stages of their education. We should create a network of "think tanks" to think about specific issues. With so many different ethnic,

economic structure, faith, social tradition. The government of the day need to recreate perfect climates for elaborate thinking and to promote good ideas and friendship to flourish. The students from different social background must be provided with an immensely satisfying experience to broaden their personal knowledge in the classroom that also adds to their credentials when seeking employment.

All our educational centres are supposed to provide freedom of thought with an intellectually challenging and stimulating environment to explore ideas and then carry them through dedicated laboratories and well-equipped workshops. Our schools, colleges, and universities should offer practice-led learning experiences that develop talent and ultimately give professional edge and ability to make good relations, which will impact their life-work in different phases of their working life with highly charged creative attitude. The hard work will help coming generations to realize their full productive potential. We expect that our youth will take responsibility for their own learning and to acquire conceptual and practical skills that are needed to make the most of their time during student life. Although we expect our students to work hard but they need to have fun and recreation to augment good cultural norms. The creative process designed to equip students with confidence and understanding acquiring a strong grasp of the historical, philosophical and social norms of human societies. This will help our students to develop a rich vocabulary to express themselves in their chosen field that will resonate with a wider audience.

Instead of trying to restrict the information economy in Pakistan, we must direct our efforts towards preparing the workforce to compete in it. With growing fear over the expansion of outsourcing which has been more important to seek input from education. The business leaders and government need to determine how to fast track programmes that will help in reducing the number of out-of-job-the-workers. We take advantages of this great opportunity to offer more advanced course in business management and computer science field. We need to attract new corporate businesses by providing full training solutions to produce better trainers who lead to greater business satisfaction through instructor's effectiveness in tailoring the curriculum and to satisfy students' needs, keeping in view the abilities before and after post graduate teaching.

EFFECTIVE EXAMINATION SYSTEM

Enhanced technology can provides realistic exams by asking questions with new contents, graphics and complexity. All test assessments including learning based objectives according to prospective employers, options for online advanced reporting features giving immediate results. We need to handle efficiently more resource intensive exams.

Ours educational process should have a good homogenous blending of humanities,

science and technology. Selection of student should be done on the basis of age and level of mental understanding and not solely on scholastic achievement. No formal written test to be conducted. Students applying for admissions should be required to go through a series of interviews to assess their entry level. Efforts should be made not to deny admission due to lack of financial resources on the part of students. In case of academic deficiency, students should be required to undergo make-up study by putting additional efforts.

Some higher educational institutions of global structure have announced a long term initiative that intend to create public web sites for some 2000 courses and to post materials like lecture-notes, problems sets, examinations, simulations, even video lectures, but the visitors to these websites do not earn college credits. However, most of the universities have been flocking into "Distance Learning", offering courses online to off-campus paying students, but these ventures are failing to offer a whole university environment in one swoop.

THE LIFE JOURNEY BASED ON LEARNING ALL THE WAY

Let all of us join for journey that will take us on a learning experience that will last us a lifetime. Lateral, inspirational and critical thinking are attributes that promote achievement and future success. Our professional teachers should continually be engaged in research or practices, which influences, and enhances our teaching programmes. Prominent scholars of domestic and of international global standings should supplement the expertise of our teachers in the cutting edge technologies with appropriate teaching practices.

Apart from humanities, social and natural science studies, we must aggressively redesign curriculum in product design, textile, visual communication, interior design, fine art, architecture, design engineering, etc to fulfil the country's needs through healthy competition in trade and industry.

The question of whether university knowledge could be turned into online is a big question. The central value of on-campus education is human experience of students with teaching faculty working in class rooms and laboratories and students learning from each other, and the kind of intensive environment created in the campus, which make arrangements for knowledge gap courses without charging tuition fee or credit rating to identity student's aptitude for efficient technological tools.

In order to minimize the risk of cheating, the students be monitored continuously while sitting for an examination by a video camera with a viewing screen in Controller of Examination's room to view all activities of the examinees from outside the examination room. This viewing includes video and audio monitoring. The academic administration

need to be well respectful, and Involved in developing collaboration with other institutes to earn credibility at the highest level, Everyone be allowed to benefit from the website, facilitating a ”moment” audit analysis of the current status and performance of the institution. Allow a reasonable discount in tuition fee on the basis of need-cum-competence, the best way to stay current on the performance by talking with academic experts on a pre schedule consultation. The principal shortcomings to exploit benefits from emerging technologies are summarized as under:

WEAKENING JUDICIAL SYSTEM

The uniformity and universality of law is made, interpreted, modified and enforced by human beings; the perfect justice can possibly never be attained. However, only by insisting on maintaining the principle of uniformity, we can achieve the highest level of justice which is humanly possible. The flexibility of laws allows us to accommodate changing preferences of the society. Many deep-rooted changes in beliefs, institutions and system are needed to transform the system of governance to a well-functioning and just system. It is on record that our lawmakers as well as dispenses of justice have failed to arrive at the same conclusion in essentially similar situations. The judiciary seems not to attach much importance to the doctrine of precedence in arriving at the final verdict.

KNOWLEDGE BASED MANAGEMENT

Knowledge is now believed to have become a tactical weapon. People who are able to learn from their own knowledge and experience can design new methods and techniques, without this any industrial and trade policy or development strategy will succeed. The most crucial yet intangible production input is information and knowledge that should be recreated to suit the ground realities. The strategic area lies in computerization of command –control-communication network required for global trading, avoiding commercial espionage, reducing complexity, rigidity and vulnerability to achieve international competitiveness. Again the gap between what could be achieved with new technologies and the capacity of social carrier is becoming a bottleneck for progress and prosperity in the country. Competency in community research has its own limitations. Community specialist generally tend to become parochial and over focused, many draw unwarranted general conclusions from their limited personal knowledge and experience.

NEW DIMENSION OF NEIGHBOURHOOD RELATION

With October 12th, 1999 event (The Herald Magazine, Karachi Oct. 1999) Pakistan was fallen into a deeply troubled relationship with our neighbours. Luckily this is now improving at faster rate since the Vajpai’s government in India. We should hope to navigate our way through difficult policy choices in the years ahead, unless we have

leaders who understand how the world works beyond our boarders, and the politicians who are able to see Pakistan from the viewpoint of non-Pakistanis, we cannot cooperate or spread our influence in South East, Central and Western Asia. Unless we are able to convince others to see things from our own perspective or help them to acquire information through dispassionate analysis which matters most. Usually it is is not what the decision makers in the government say and do, but their competence and political sagacity is the one that is crucial.

UNREALISTIC HIERARCHY OF POLITICAL PARTIES

Most stalwart politicians in Pakistan are not trained to build a workable social model that can be empirically tested. They are also unable to formulate a feedback system in their own political parties, through activists gathering information from prospective voters. The decisions are usually based on hearsay and are heuristic in nature.

ABSENCE OF COMMUNITY BASED STUDIES

Our academicians have not given serious thoughts to researches on community based studies. Social welfare work training is not an integral part of our college curriculum. We have failed to realize that huge personal involvement is needed to undertake serious research in matters concerning community work.

UNSKILLED AND UNEDUCATED LABOUR

The cynical approach of haphazard and windfall growth by some notable planners, past and present, must realize that the country could not prove attractive to foreign investors by low-labour cost only. The real productive capability difference between our indigenous labour and that of the Far-East Asian countries is due to lack of education. The education that leads to skilled labour will make effective use of productive potentials of the country, which includes manpower, capital resources and management tools. Labour in Pakistan since long is seen as a cheap commodity. There seems less incentive to quality education and skills development in the workforce.

PRIORITIES OF FUND ALLOCATION

Pakistan spends for more on military than on education because India is thought to be a military threat despite looming friendship created very recently. The myth of huge spending on defence forces blinds some of our political decision makers to the bare reality that ignorance is the country’s real enemy which we cannot fight with large number of soldiers alone.

HIGHLY FRAGMENTED EDUCATION SYSTEM

How disgusting is the fact that Pakistan has now being dropped from the list of the World Economic Forum surveys. If we were listed, it would come somewhere near the bottom of the list, much lower to India. The reason for our low educational status has been mainly due to highly fragmented educational system. It has created some insurmountable problems in the optional utilization of our human resources under the exciting labour market conditions. It is surprising that present budgeted figure allocated to Pakistan's Higher Education Commission serving a country of 150 million people is about half of the budget of a medium sized university in Japan.

THE DILEMMA OF PRIVATE EDUCATION

Private education is a booming industry in the country. It is perhaps seen as a guarantee to ensure future of our children and to save them from neglected public education system. Private education from 2000 is in the process of being camouflaged by vested interest and moneymaking frenzy. If we want to succeed we must decide to develop confidence in ourselves with such a passion that it is no more rhetoric but becomes a living reality. The detail of knowledge which is important will be picked up in each avocation of life, but the habit of the utilization of well-understood principles is the final possession of wisdom, and it grows as the knowledge shrinks in the process.

ORTHODOX MIND- SET OF BUREAUCRACY

Politician's powerful hold on public opinion has been a source of envy on the part of bureaucracy during the entire period of Pakistan's history. The incident of October 12, 1999 in the country was a wake up call for politicians. The events showed how poorly prepared are our elected civilian governments to deal effectively with crisis situation. On this fateful day no political party had the vision to forecast future events. There was confusion in the press about how and what really happened in that week. The media miserably failed to cover the incident's report correctly and failed to give a rational account of plane hijacking and other events that followed immediately.

UNSCIENTIFIC METHODS OF DECISION MAKING

The ever declining ability of decision members both in public and private sectors is principally due to non-availability of authentic data, absence of good research on sensitive social issues, and the dominant influence of fraudulent money-makers in Pakistan. This has been the major factor of corrupt practices in the country.

EFFECTIVENESS OF IT

Computer technology is now accessible at the click of a mouse or pressing of a return

key. It is no longer possible for any nation, big or small, to avoid this technology. It is easier and more empowering; it is no more impersonal as one may have thought. It opens the doors to warm and lasting relationship. It gives us more or our time for things unrelated to our profession and provides more time resource. Information has assumed unparallel dimension, a sense of freedom, a remarkable flexibility in method and techniques. Many innovative and creative spirits cherish the freedom of not having to be chained to one place. They have the facility of being connected from wherever is convenient for them to be connected. Work now a day does not care where it is accomplished, and if it is accomplished with excellence. Those who confine to a virtual office, they have opted for a life, not of independence, but of interdependence, knowing that they get with a little help from their friends who are really interdependence performers forming a chain of networks.

IT is almost globally operative affecting all social structures. Surprisingly although by nature it is intangible, but is as important to the operation of modern industrial society as oil or coal. Although it is non-material, colourless, odourless and tasteless yet it is a substance which could be manipulated, processed, packaged and sold by over 60% of the developed world marketable products. Information on a screen, sound, picture, codes, grooves in a recording devices or a digital bits on a computers. Information technology is concerned with processing, transferring and analysing it in communication processes. The numbers of people involved in this activity are huge and are ever increasing. Computer are used by a wide rang of professionals for all kinds of jobs.

It is now touching the lives of most of the people and is bringing radical change in the life style, the pattern of economic growth and perhaps decisive changes in education and training methods. It is creating changes in human societies much intensive than those produced by the industrial revolution. The growing integration in computer and telecommunication technology at a pace in excess of the average growth rate of the industrialized countries economies, data gathering, storage and analysis capabilities of computers are now readily accessible throughout the world.

Computer technology has developed so rapidly that policies designed by national government to deal with important issues are lagging behind. It is very difficult, and in some cases practically impossible to contain and control it within national boundaries. Trans-boarder date flow and the privacy and sensitivity of software are two of the principal issues posing risk and dilemma especially amongst the industrialized countries.

Although developing countries are equally effected with these issues, but they are faced with a issue of more serious nature. They are threatened with the danger that their territorial integrity, national freedom, and moral value exposed to impending drastic changes. These countries are also in a comparatively disadvantaged position in pursuing their own development goals and in securing the anticipated growing share in world

economic growth in order to meet the needs and aspirations of their people.

It is becoming difficult for countries like Pakistan to obtain appropriate share of the research capabilities to produce new technologies such as, manufacturing technology, control of data networks, intellectual, and professional skills necessary for development. The multinational corporations of the industrialized countries possess high degree of pre-eminence in modern fields of technology creating an attitude of total dependence on the advanced countries.

Pakistan, therefore, cannot escape to face up to these challenges of technology gap, while starting from a position of comparative disadvantage, there is much we can do to overcome our underdevelopment by creating certain competitive advantages on our side. It is necessary that government policies in IT areas will have to be carefully balanced to obtain the principal benefits from the employment of the best technologies in various sector of our economy. One area in which IT is likely to have a profound impact is the development of our human resource. This requires a quantum change in our educational and training systems. We must move in the direction where people play a major role using the kind of skills that need effective education and better training with a proportionally diminishing role for unskilled or semi-skilled workforce. We would require only relatively short periods of specialized vocational type training, to be supplemented by on-the-job training.

The most urgent and primary need for Pakistan is to ensure full access to knowledge of the rapid changes taking place in computer and communication technologies and their applications to develop the capacity to use these. We must also develop the policies, programmes and action plans which would enable us to derive the benefits and minimize the risks associated with emerging technologies.

UNEMPLOYED GRADUATES

There is a gross imbalance between education and employment market. Knowledge is now believed to have become strategic resource. Restructuring of educational system in view of human resources deployment is of high priority, without this people are not able to earn respectful wages, and without these no economic sustainability will be achieved. Those days are gone when civil service officers were responsible stakeholders. The bureaucracy has brought most of the misfortunes on the nation. We need innovators not replicators and it is not possible to innovate unless one possess proper knowledge and competence in current knowledge in the present world of sophisticated human resource management.

The emergence of IT would have not been possible without recent development in microelectronics and in complementary interface technologies such as, sensors and

transmission device. In fact microprocessors, memories, and input-output devices have become increasingly powerful which used to be strictly separated, are now being increasingly linked together into integrated information system. The first most crucial yet intangible production input i.e., information and knowledge could be recreated, linked together, transformed and communicated practically at random. The strategic area of attack for IT is the computerization, of command- control-communication network required for global industrial development to stop and to reduce complexity, rigidity and vulnerability to achieve international competitiveness.

Although in pure technical terms vast possibilities have been opened up for searching, storing, processing and communicating information. A drastic transformation of labour market in needed which should have positive effects on capital formation, innovation in production methods and towards further industrialization. A significant change in the content and social carrier of work in reorganization of human resources development is needed such as: -

Flexible working time and creation of part time employment.
Expansion of informal labour market, especially in the services sector and black economies.
New methods for employing productive potential of women by integrating the "Home Work" economy.
New resourcing of labour catch from madarasahs, mosques, mazars, etc.
Sourcing for all types pf labour from skilled to the scientific, technical and managerial levels.
Creating new forms of automating scientific, technological and managerial tasks.

The last 58 years of Pakistan has witnessed stagnation or frantic search for survival strategies, which has set the stage for development planning. Now, it is time to plan "On choose and lose basis". The overriding concern of human resources development in 21st century should be to improve the capacity, both of the individual and of society adjusted adequately to a changing scenario of the world. This necessitates:

Elimination of outright or functional illiteracy particularly in women.
Augmenting basic skills in "Seeing", "Listening", "Reading", "Writing" and Numeric.
Improving general learning ability of individual on collective basis, particularly of females in as many rungs of society as possible.

"Quick Fix" solutions are out dated. We must transform the existing educational and training methods, which are bound to be time consuming. We must not adopt reductionist concept of skill formation. We must clearly understand that human cognition functions in computer based technology which marginalizes the worker, and reduces his decision making and control functions. As the physical efforts decreases the boundaries of knowledge and skills required for the worker, it also intensifies worker

dissatisfaction.

Human beings are not computers, while we can imagine being able to reason in a perfectly logical manner. We also know from our own experiences that often we fall short of this quality. Our social thoughts are subject to a wide range of tendencies that can lead us into serious errors. These tendencies sometimes cause us to develop wrong impressions or judgments about others, such errors are related to many aspects of social behaviour, including first impression of others, persuasion and judgment about others innocence or guilt. On the other hand, we human being are capable of remarkable achievements. We can perceive future events we respond instantly to external stimuli; we are capable to solve complex problems. We can create "master piece" things and ideas.

When people interact with a computer system, they are primarily interacting with information or data in a raw form. Our objective in using the machine is to carry out a task in which information is accessed, manipulated or recreated. The understanding, how people use computer as a system of information processing comes from studying how user interact with computer in a particular work environment. This study is technically called Human Computer Learning (HCL) and consists of four components: (a) the users, (b) who has to do a particular task or job, (c) in a particular context, while, (d) using a computer system.

Each of the above components has its own characteristics, which influence the nature of the interaction between the user and the computer system. The user interface of a computer system is the medium through which a user communicates with the computer. It can be thought of as those aspects of the computer which the user comes into contact both physically and cognitively. To this end HCL is essentially cognitive, as it involves the processing of information within the capabilities of the users' mental ability, in cases where computer is used within an organization, it is necessary to understand social psychology.

Social psychology deals with ways people interact with environment. In social psychology the human information processing involves the following stages:

Encoding the information from the environment into some from of internal model already present in the brain.
Comparing this representation with previously stored model in the brain.
Deciding on a appropriate response, then organizing the response and consequential action.

The implementation of computer technology does not occur in a vacuum. Computers are used in quite different organizational contexts, and human cognitive faculty is required

on a fairly large scale. It has been proved that even routine computer operations depend upon human judgment.

The expansion of skills required for the manipulation of physical world is bound to be an essential element of any strategy of human resource development. In future scientific and engineering efforts human capability will become more widespread and receive more cultural prominence. The need for some level of technical qualification as part of normal employment requirement will be increased. The computer based automation is applied to a growing number of industrial manufacturing and complementary service activities. As a result of computer based automation, workers mastery of a specific set of tasks within precisely defined job roles in becoming less important than his ability to integrate individual activities within the flow of the production process as a whole.

Education and training institutions may help to produce cognitive and vocational skills, as well as behavioural pattern. Educational achievements are powerful determinants of occupational and social competence. But the instrumental component of educational system might lose its capacity to contribute to economic and social development. Nowhere has this instrumentation of education is carried further than in the United States. However, its results have hardly been convincing. According to some studies carried out by National Science foundation of USA (Harvard Report, 2000), there has been a significant decline in the capacity for both, research and teaching. According to Harvard graduates school of education, the dominant American approach to education has emphasized logical mathematical knowledge learning process. Is this the best approach for the rest of the world? Is it even the best approach for the United States of America?

CONCLUSIONS

Although the world has changed for better, but the pace of change is very drastic. The capability of human being has expanded enormously, his dominance and reach to control events has enlarged. Modern world would survive provided it is able to take right decisions about the problems faced by people squarely, just and in time.

Confusion in social, moral and emotional conditions is getting very disturbing. Material progress achieved through the use of technology is all pervasive as compared to moral and psychological competence of human societies. Western societies are now practicing their ideologies, but contrary to this Eastern societies are still in the realm of conceptual controversies. They do not practice their ideologies honestly and are unable to measure their progress in real practical terms.

Philosophy and social psychology has clarified our understanding, concepts, thoughts and ideas, which are usually interactive and lead to real results. Social psychology has

now reached to the stage where it is possible to predict future of human progress more precisely. However the western thought process is very distinctive in its paradigm, but in the East it is quite otherwise. Our thought processes in the East are not so consistent and are not based on our own experiences. It is high time that Eastern societies bring their hopes and emotions at par with realities of our times.

The over all conclusion is that Pakistan has made a moderate growth in social and economic sustainability during the last 59 years. The trend of IT is going up steadily, but the time wise transformation of knowledge from the beginning till today is sluggish. It is less than 1.0% of our GDP.

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