INFORMATION EXPLOSION, CHALLENGES AND OPPORTUNITIES

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[**Abstract**: *Digital revolution sweeping the world has brought about information explosion at an unprecedented scale so much so that storage and retrieval of the data becoming available is becoming challenging and more challenging is the processing and analyzing the data for possible economic values and social gains. Societies and individuals who are able to operate on computer based tools and related software, are able to develop softwares suiting emerging challenges and have developed skills to analyse the avalanche of data are getting into higher and higher pay brackets. Those who are not able to cope with the digital tools and remain illiterate in digital language are being pushed down the ladder in the job market. Newly found skills are not to be restrained by borders of the nation states in larger interest of generation of wealth and thus fixing of quotas for movement of skilled manpower from other states is regressive. To bridge the digital divide among the societies and individuals, education planners are required to entirely reorient the functioning of the schools by introduction of facilities which train their products to be digitally literate and essentially inquisitive to analyse the vast data being generated by infinite connected devices throughout and who are capable of mining gold nuggets out of the vast mine of data for useful economic and social values. Thus societies who are enabled to bring about the directional changes would economically get advanced more and more and others would slide. The digital gap would create inequalities to be bridged by the dissemination of the digital technology as appropriate. The digital society would also breed negative feature of spread of misinformation and disinformation by elements who refuse to get out of ignorance and prejudices with a determined mind . There would be issues relating to privacy of individuals, states and businesses which would need to addressed as best as the technology can assist. The march of digital technology and rate of information explosion would continue rapidly by the day, the political system has to adjust itself and realign its institutions in dynamic mode.*]

Technologies undoubtedly bring about multidimensional changes in society and impact the mind and the cultural behaviours also. Under the impact of changing technologies, every generation experiences a distance or feels cut off from its predecessors. The Nineteenth century society felt cut off from the medieval society, whose stability was based on religious faith, with the introduction of mechanical dynamics for steam driven railways and ships and the telegraph. Next generation society living in the early twentieth century felt cut off from the mechanical dynamics based society with the onset of cars running on internal combustion engines, the boon and bane of nuclear fission and psychological insights of Dr. Freud. The society started creeping into the information age and graduating into digital age from the middle of twentieth century and since the late twentieth century it entered into the phase of a digital revolution which is intensifying at a rapid pace. The society

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at this stage is divided broadly into three different groups: digital illiterates, digital immigrants and digital natives depending upon the digital related skills of its members. Nevertheless the developments are life transforming and are impacting directly or indirectly all the members of society cutting across the geographical frontiers. Naturally there are attended social, cultural and economic impacts which would also be bringing about tremendous changes in business and scientific exchange, and industrial patterns[1].

Way back in 1997, United Nations Research Institute for Social Development (UNRISD) brought out a Discussion Paper[2] titled as New Information—Communication Technologies, Social Development and Cultural Change reviewing the then current "information revolution" explaining its technical features and delved on possible scenario for the future. When the 1997 Discussion Paper was developed, the total digitalization of all forms of information transmission, except those occurring on a non-mediated person to person level, was well underway. Digital technologies were already making profound changes in the economies and societies of countries around the world-speeding the automation of work, facilitating borderless financial transactions, delivering global news and entertainment to vast audiences. The technologies had developed permitting fusion of telecommunications, computer and entertainment industries. Those who could efficiently deploy these technologies had started deriving competitive edge by having larger pie of the world trade and business by the application of inexpensive communication and computer aided movement of goods and services. Region specific efficiencies were being cohered for producing final goods and services at the most economical costs. Even those interested in social upliftment areas, human and environmental impact studies were using the emerging technologies for wider interactions and share and exchange expertise and experiences on real time basis. Discussion Paper did not fail to bring into focus the intensifying competition to gain control over digital technologies and expressed fears that already existing trends

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[1] Framing history: contest and perspectives (2012), Bhupendra Yadav, publication discussion, Ministry of I&B, Government of India.

[2] UNRISD discussion paper no.86, United Nations research Institute for Social Development.

towards polarization in the world economy could get worsened. There was a possibility of future in which Digital Advantages could reinforce the possibility that ever smaller groups of people will determine the future use of an ever larger proportions of global resources. Developments may be concentrated in regions where the information structure is most developed, to the detriment of those areas that are not endowed with the most modern capabilities. Also within societies, a growing "knowledge gap" can separate individuals who have access to the latest equipment and have been trained to use it, from those less endowed.

The Discussion Paper observed that course of technological development is shaped by human beings with particular interests and goals, and a certain view of future which is determined depending upon the type of society, we want to see in future and then to influence the designs and deployment of new technologies in ways that are most likely to further our goals through as much innovations in designing appropriate institutions to accommodate technology breakthroughs to sub serve societal goals. The paper also did not miss out on the effect of the emerging technologies on issues like invasion/breach of privacy and possibility of spread of disinformation/misinformation. Such perils can put the individuals/societies under a scanner by the third parties and even the state endangering the individual's interests and democratic rights. A state itself can face impacts on its sovereign function. The paper also foresaw that technology dependent auto processes may be harmed and damaged by simply tampering the technology resulting in accidents and losses of magnitude much larger. The systems based on ICT technologies work in different states and suddenly may require to be reset when a response is urgently needed. The paper foresaw a host of perils of newer nature and dimensions.

In the last fifteen years since the above mentioned Discussion Paper, there have been unprecedented strides in the ICT, enhancing society's capabilities manifold in the task of creating, collecting, recording/storing, processing, distributing, consuming, recycling/erasing information bringing about uninterrupted tsunamis in data and its management stands as a continuous challenge. The world possessed 988 Exabyte (EB) of data in 2010 (IEB is equal to 1 billion gigabytes or a 50,000 year long

DVD). By implication, in 2010, every new born had 800 Megabytes (MB) of information to its credit. This, if printed, would mean a burden of 30 feet of books per child[3]. This is nothing but information explosion which is intensifying like a raging infermo[4]. To remain digitally literate, there has to be continuous learning process to be able to meaningfully process and contribute to information flow that is being encountered sweeping through academic, business, and government[5]. There is no area that is going to be untouched. Data is being recognized as a new class of economic asset, like currency or gold[6] and would have to be interpreted and communicated among interacting parties for gains and for maintaining competitive edge on the one hand and on the other seeking and offering co-operation for mutual gains and also advancement of knowledge in face of expanding availability of data from innumerable generating resources. Such thoughts address the astounding transformation of world of data, with a rate at 23 per cent growth in a year in stored information alone. There would be members of the society who would be able to keep pace with the use of emerging digitable technologies and would be able to interpret and collate data and exploit the endless growth in information, forming society's most economically fruitful and entrepreneurial class and at the same time the inequalities among the societies at large are on the increase[7]. The present day world economy's which is being reshaped by technology revolution and globalization is creating a new gilded age and a new plutocracy. The technology revolution in the West is replacing blue-collar factory workers with robots and white collar clerks with computers who are available in plenty from amongst the upward mobile and technological savvy work force from the emerging economies like India, China etc. at competitive wages resulting in higher profits to the technology enabled companies. For the Western middle class, the options get limited as it not easy for them in their mid-lives to acquire skills in new information technology and thus this class of

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[3] *Op cit* 1.

[4] Taming the information explosion, IT in Canada, http://www.itincanada.ca

[5] The Knowledge society: The impact of surfing its tsunamis in data, storage, communication and processing. http:/www.wcu.edu/ceap/houghton/readings/tech-trend

[6] Mining an information explosion by steve lohr (The New York Times) http://www.chinadaily.com.cn/Sunday/2012-02/19/content_14640413.htm

[7] *Op cit* 5.

society in the west gets pushed downward in the employment market[8]. "This is what the political scientists Jacob Hacker and Paul Pearson call the "winner take-all economy". In the context of American Economy, the increasing inequalities is not a picture of healthy society. Such a level of economic inequality; not seen in the United States since the eve of the Great Depression, bespeaks a political economy in which the financial rewards are increasingly concentrated among a tiny elite whose risks are borne by an increasingly exposed and unprotected middle class. Income inequality in the United States is higher than in any advanced industrial democracy and by conventional measures comparable to that in countries such as Ghana, Nicargua and Turkmenistan. It breeds political polarization, mistrust, and resentment between the haves and have-nots and tend to distort the working of a democratic political system in which money increasingly confers political voice and power. It is generally presumed that economic forces alone are responsible for this astonishing concentration of wealth. Technological changes, particularly the information revolution, have transformed the economy, making workers more productive and placing a premium on intellectual, rather than manual labour. Simultaneously, the rise of global markets – itself accelerated by information technology – has hollowed out the once US dominant US manufacturing sector and reoriented the US economy toward the service sector. The service economy also rewards the educated, with high-paying professional jobs in finance, health care, and information technology. At the low end, however, jobs in the service economy are concentrated in retail sales and entertainment, where salaries are low, unions are weak, and workers are expendable. The system confers tremendous benefits on highly educated and highly skilled elite while leaving other workers behind[9]. "The past is prologue and we have been here before. In the 1890's just as we moved from an agricultural economy, we now see the same attempt to profit from economic change, disruption and chaos, as we move from industrial economy into the information age". Thus wrote Joe Trippi in his essay on the state of government and the economy[10]. Cornel University

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8   Some See Two New Glided Ages, Rising Global Tensions, N.Y. Times, By Chrystia Freeland January 22, 2012.
9   American Politics and the Second Glided Age by Ben Atlas at benatals.com on 01/06/2011.
10 The Second Glided Age? By: Kathy Gill, About.com. Guide October 2, 2008.

economist Robert Frank analyses this development in his recently published book. "The Darwin Economy". In it, he concludes that financial realities are best described not by Adam Smith's economic models but, rather by Charles Darwin's thoughts on competition – the fittest survive – and the general public is left behind. Indeed, only 4 per cent of less-well-off Americans ever successfully make the leap into upper-middle class[11]. Thus transformation brought about by the Information Revolution as in the transition from agriculture economy to industrial economy, is creating intense political and social pressures, partly because change is always hard, and partly because the rewards of this sort of compulsive shift are so unequal. The options as were available at the time of industrial revolution are no longer available in the sense there is no New World to emigrate[12]. The solution this time lies within and through the information technology itself so that its reach and benefits are extended to cover the maximum people on the planet so that there is all around appropriate skill development cutting across digital deficiencies and mining of the unexplored wealth of accumulated and accruing data is exploited for wealth generation by way of optimizing the use of existing resources and locating newer and newer resources. May be we aim for a world when technology enables us to get mega energies through nano consumption of existing as well as new resources in the same manner as we have been enabled to bring the world together by cutting geographical constraints and time taken to traverse. Such a vision is feasible, as was envisioned way back in UN Discussion Paper referred in earlier paragraphs by bringing about institutional changes fashioned to subserve such a vision.

Data has already been identified as new class of economic asset, like currency or gold. It is not just that there are more streams of data, but entirely new ones. For example, there are more countless digital sensors world-wide in industrial equipment, cars, electrical meters, and shipping crates. They can measures and communicate location, movement, vibration, temperature, humidity, even chemical changes in the air. Link these communicating sensors so computing intelligence and

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[11] The second Glided age: Has America Become an Oligarchy? By Thomas Schulz, Spiegel online International.

[12] *Op cit* 8.

you see the rise of what is called the Internet of Things. Improved access to information is also fueling the Big Data trend. All kinds of Governments' Data is accessible to public. The computer tools for gleaning knowledge from the internet's vast trove are fast gaining ground. At the forefront are the rapidly advancing techniques of artificial intelligence like natural-language processing, pattern recognition and machine learning. Those technologies can be applied in many fields[13]. The wealth of new data, in turn, accelerates advances in computing. Machine learning algorithms, for example, learn on data, and the more data, the more machines learn. In business, economics and other fields, decisions will increasingly be based on data and analysis rather than on experience and intuition. It is established that data driven decision making leads to enhanced productivity. The predictive power of big Data shows promise in fields like public health and economic forecasting. The economy and endeavours of human society are fast becoming data centred. At this stage, one can see the outlines of it, but the technical, infrastructural and even business model implications are yet to be grasped to reach confidence levels. What one is certain about that the world contains an unimaginable vast amount of digital information which is getting ever vaster even more rapidly. This makes it possible to do many things that previously could not be done: spot business, prevent diseases, combat crime and so on. Managed well, the data can be used to unlock new sources of economic value, provide fresh insights into sciences and hold governments to account. Proliferation of data, however poses challenge of making sense of the available data and inherent wisdom lying hidden within. Given enough raw data, today's algorithms and powerful computers can reveal new insights that would remain hidden otherwise. The business of information management-helping organization to make sense of their proliferating data is growing by leaps and bounds. In recent years Oracle, IBM, Microsoft and SAP between them have spent more than $15 billion on buying software options firms specializing data management and analytics. This industry is estimated to be worth more than $100 billion and growing at almost 10 per cent, a year, roughly twice as

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[13] *Op cit* 6.

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fast as the software business as a whole[14]. Data is widely available; what is scarce is the ability to extract wisdom from them. There are thus obvious opportunities for jobs and entrepreneurship for those that are prepared to handle the significant gaps between what is new and our personal capacity to respond in an environment of information infernos. At the present stage of development of informative age scenario, significant information is available virtually at no cost of storing, communicating and processing as there are numerous open sources of downloadable software applications for computing and processing information. Hundreds of free web applications in dozens of categories with global impact through search engines and programmes designed to respond to specific problems such as life-saving, crisis management, global banking, protecting public intellectual property and free online global storage and publishing via social networks. Users of information have been making progress individually and culturally resulting in social collaboration and collectivism to create value of themselves. This happening phenomenon is akin to what happens in a class room environment when students, teachers and library resources etc. interact/pair/group together to accomplish certain tasks. In the emerging scenario of digital environment, educators would be required to reorient their methodologies with a view to incorporating the digital based teaching aids and create among the students and also among themselves the curiosity levels to trigger a vision for looking at the things creatively so that students and teachers alike can visualize the gap between their present level of understanding and how digital aids can bridge such gaps. Education Policy mandarins, teachers and libraries and the books and journals contained therein have to work out a new mission to model and improve digitally literate composing and thinking. Such a recipe would enable or be significant step for handling the task of increasing deluge of data and attempts to ferret out gold nuggets out of the increasing mass of the data. Wider broadcasting the movement of digital literacy at different levels as the learners advance would not only minimize the digital divide among nation, societies and individuals on the one hand but also advance the knowledge base of the society and enable it to accrue advantages from proper analysis of stored information

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[14] Data, Data everywhere- but also big headaches, Kenneth Cukier (Interview) Economist.

(growing @ 23% a year) communicating the same across space (growing @ 28% per year) and compute and process such information (58% growth per year)[15]. Sooner the skilled digitally trained manpower is available in numbers, quickest it would be possible to deploy and manage the digital tools, do the analysis and discover the information, the issues and questions and thus it would facilitate the presentation of creatively composed solutions to the problems that come before the society. The educational curricula at different levels have to increasingly integrate the emerging digital culture blending all the mediums and the associated cultural perspectives through highly analytic and abstract literature of computational thinking enabled by computer software's[16]. One is tempted to recall Milton's vision when he wrote in his Paradise Lost that whole knowledge is an arc where through gleams the untravelled world. More softwares the mysteries unlock in the stored data through computational skills the newer and newer mysteries are getting presented to be unraveled with distance promises of better and newer insights. So there are always gaps to be crossed which need to be bridged through better software design and better and refined computational skills through evolving creative activity. Such a class of people who are enabled to process by their analytical and creative thinking the onslaught of the flow of information would qualify to be included in creative class of the knowledge Society and world, if driven by entrepreneur skills, command highest premium in the market and in any case far better than those engaged in conventional professions like retailing, manufacturing and trading[17].

Mckinsey global Institute, in 2011 projected that the U.S alone needs 1,40,000 to 1,90,000 more members with 'deep analytical' expertise and 1.5 million more data literate, whether retrained or hired[18].

Even with the rapid rise in the demand of creative class, the U.S. policy of putting a cap of 65,000 on visas per year for this class is looked at with askance by the

[15] Hilbert & Lopez; The World's Technology Capacity to Store, Communicate Information, Science magazine, org./content/early/2011/02/09, science,12,00970.
[16] *Op cit* 5.
[17] Florida, R.(2012). The creative class recruited New york: Basic Books.
[18] The Age of Big Data, Steve Lohr, The N.Y.times,file.11,2012.

technology leaders. "The cap bears no relation to the U.S. economy`s demand for skilled professionals'' stated Bill gates in his testimony in congress in 2008. It has been argued by such proponents as Bill gates that such restrictive policies have pushed the entrepreneurs to establish Centres of creativity in other countries and thus associated fall out of wealth creation gets shifted. According to Bill gates, such a cap must be seen as one of the most astonishingly naive move and self–defeating pieces of legislation that a national knowledge culture could invent. However from a global prospective it has been invaluable in contributing to the rapid expansion of international knowledge society.

When, the school curricula internationally are seen in the face of the fact that 94 per cent of world's information is being available in digital format, these appear to be hopelessly out of tune and seem to be working on a model as if entire information is available in paper form. Their funding and the skills of teachers do not provide for necessary tools for the new literacy matching the digital world and culture. Even the higher classes also are conducted in the same mode. So the product turned out by our institutions of learning is handicapped severely and would increasingly become outdated assets in the digital based economy and would join the army of unemployables.

The education planners should be taking into account the fact that skill developing digital tools are becoming abundant and cheaper by the day and further a large number of softwares and computational tools with operating instructions are available free of costs to an extent that learning groups can develop interacting groups across differential reaches to accelerate exchange of ideas in all disciplines and have access to excellence that may be buried beyond their reach otherwise. This would hone their curiosity, sharpen and reshape their aptitude of problem discovery and solution solving and make them analytical multidimensionaly and capacity to think out of box. There would be solutions to move from non-productive use to productive use and add to economic values of the society as whole.

To fructify such a solution, way ahead would be to trigger the entrepreneurial advantage of the world's current and incoming information by creating a band of

creative output from our educational institutions, who are enabled to access, process, analyse and taking entrepreneurial plunge by overcoming road blocks which may be arising out of inertia in policy reorientation and may not be arising out of financial constraints. Those who are concerned with quality job creation should be able to overcome constraints of inertia and self-serving prejudices coming in the way of reorientation of system by convincing the political masters about the dividends that lie ahead for them and for the society, who will attain competitive edge and excellence through appropriate reorientation of curricula. John Gantz and David Reinsel[19] have assessed that there would be growth of information by 75 times by the year 2020, the pool of IT staff to manage the growth will increase by a factor of 1.5. There would be a persisting and huge gap between the capacity to store the data safe and secure. There would be additional challenge to the enterprises and organizations for dealing with the nuggets that would be pulled out by their digitally trained CEO's' and staff. Therefore not only curricula at primary, secondary and degree levels needs to be redesigned to respond to the requirement of digital universe, even the institutes of higher learning of all disciplines, from liberal arts to core and applied science have to be enabling ones capable of producing and training manpower to take the challenge of decision making rapidly while they are at the helm of affaires in industries and also in governments. Need of the hour would be all around social comprehension and social initiatives for turning on the value of unlimited wealth for all humanity[20].

The challenges before the planners and policy makers in governments and business leaders are diverse and are rooted in the stage of development of global societies. Well over 94 per cent of the world's information was digital in 2007, and that quantity has continued to grow since. These societies are beset with varying degrees and categories of gaps ranging from gaps between digital composition, communication skills, knowledge base, economic, institutional etc. The availability of resources in material and skilled personals to bridge these gaps is another gap, which

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[19] Extracting value from chaos by John Gantz and David Reinsel
      (June2011)http://idcocservalue.com.1142.
[20] *Op cit* 5.

remaining unaddressed continues to widen the other gaps enumerated above and consequently the vicious circle continues to expand. There continues to be a widening gap between the available knowledge and processes freely through the medium of internet ready to be exploited for economic gains. The alibi that use of the internet media was heavily loaded in favor of the English knowing countries is no longer tenable as the digital literacy, thanks to the convergence of all formats of communications, has given birth to digital language and can be expressed in the form of frames, text, images, video, sound, 2D animation, 3D animation, sensor/robotics, and workflow. Except for the text format which may be language dependent and on its proficiencies, rest of the formats are able to create new composition for the art, humanities, and science that aid communication of new ideas. The development of such formats would depend on the creation of software for relevant applications. There is a growing market for software developers which have impressive sales already. The software sales of Apple Store has reached the level of 25 billion dollars for just a segment of digital devices[21].

Despite an exploding demand for software developers, which will require skills in composing sentence in the digital language/literacy described above, the product being turned out by our institutions of learning from primary level onwards is not imparted skills in composing their thoughts in the digital language which make them ineligible for availing of the high level job opportunities such as software developers. Teacher education programmes also do not equip teachers to impart instructions to their students in digital literacy. Teachers would impart instructions as per the prescribed curriculum. The school curriculum designed have failed to grapple with this wide ranging new literacy. The students are not being imparted basic skills in computers in their primary and secondary levels as the school curriculum are deficient and thus teacher training programmes have not been tailored to suit the emerging culture of digital literacy.

Educational institutes with their limited resources and within constraints of the prescribed curricula have been doing excellent jobs in imparting foundational skills in

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[21] *Op cit 5.*

various disciplines which are also very vital and basic for the development of computer skills and digital literacy, but obviously much more needs to be done through the initiatives of policy makers and business leaders to design curricula and the educational programmers to suit the demands of the emerging market and culture of digital technology and digital literacy. Simultaneously the skills being imparted through the conventional inputs need to be redesigned to make the student minds more questioning and of higher order in thinking, so that when they move towards acquiring computer basic skills and its language, they are able to interpret data and their co-relation in wider-most content in their pursuit of quest for more and more knowledge so that nuggets lying in vast and deepening and widening oceans of data are perceived by them clearly to extract economic and social values that too refined continuously.

There is uneven development and deployment of digital technology across the nations and within the nations which have been studied by many scholars and notable among them being Martin Hilbert who has captured the nature and extent of this divide from manifold outlooks and has made policy recommendations for practical usefulness[22].

There are two significant ''access gap'' problems. In less developed countries where incomes are low there is lack of access to personal computers and the Net and thus there is lack of exposure and awareness. Even if some among them are capable of possessing a computer and some among them have access to net, there is no exposure and awareness about the basic knowledge and skills to access, process and communicate information. Those among them who manage to overcome such gaps gain upward mobility in gaining opportunities to well-paying jobs by dint of skill based knowledge acquired by them. As the hardware relating to technology is becoming cheaper by the day and at the same time its capacity and quality improve, the price of items based on this technology drops to make the product cheaper and abundant. The entrepreneur is willing to pay such skilled workers higher and higher. Some among the digital trained skilled workers innovate to make advanced use of

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[22]   *Op cit* 5.

the technology and stand to get rewarded handsomely. Thus the digitally qualified and innovative among them move higher up the ladder. Such a skill based technical change has the potential of raising inequalities which in its train brings about social, cultural, geographic, and other inequalities including towards distortions in distribution of wealth. Low wealth countries societies continue to get pushed downward as their capacity to invest in public schools keeps getting eroded.

There is an iron curtain of digital divide among the poor and the rich nations and also among the societies within nations. There are innovative initiatives to soften the divide by reducing the access gap through political initiatives enabling all citizens and schools, to take advantage.

Finland has gone to the extent of legislating that Net Access is a legal right for its citizens and Japan, South Korea, and Sweden are close to such goals. U.K. and U.S. have taken significant initiatives for universalizing digital literacy in their countries[23].

Government of India has an objective of one digitally literate person from per family in India under this initiative it is proposed to connect 2,50,000 Gram Panchayats (village bodies) through a fibre optic network, which would increase broadband connectivity. As a first step to obtain this objective, a pilot project has been initiated in which Bharat Broadband Network Limited (BBNL), a special purpose vehicle setup for this purpose, will lay down 5,00,000 km of fibre optic cables in Tripura, Vizag, and Ajmer. BSNL, Power Grid and Rail tail will assist BBNL in this project. It has been proposed that a digital literacy week may be observed in India to spread awareness about broadband and digital literacy, and how individuals could leverage internet to add quality in life[24].

Besides there are various private initiatives underway in India for spreading digital literacy in India and notable among these in digital literacy training programme are

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[23] *Op cit* 5.
[24] One digitally literate person per family- Digital Empowerment...def. India.net…/one-digitally-literate-person-per-family-govt-.

by Microsoft India[25] and digital literacy project by the East West foundation of India[26]. Project Jyoti, a community technology skill programme launched by Microsoft, has been under way since 2004, towards empowering marginalized women and rural communities by imparting IT skill, training or basic computer literacy. It has already benefited 4,30,000 people through its country wide network of 1,425 community technology learning centre.[27]

On 1st May, 2011, The United Nation's Human Right Council commissioned a report to serve as a basis of discussion on the role of internet. The author of this commissioned report has observed: "Given that internet has become an indispensable tool for realising a range of human rights combating inequality and accelerating development and human progress, ensuring universal access to the internet should be a priority for all states"[28].

Dynamics of school policies would be determined by the state who itself would be dictated by many objectives including that of inculcating appropriate skills in dynamic mode depending upon the demand of the market and further also by the availability of fund flow to sustain such a process. Fund flow to the education system may be from sources other than government and not necessarily from the philanthropic motives but may be purely out of temporal motives needing to have appropriately trained personnel to become a feedstock of the segment of the economy in which the fund provider is interested for gains. In the united states, the first major ''seeding '' in direction of reorienting the schools to introduce computers in the curricula in a big way was made by the Apple Classroom of Tomorrow (ACOT) research project making available computers and related technology inputs to students and teachers for use at home and at schools with a view to exploring the impact of computers on learning processes. The first initiative in the same vein at

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[25] Digital literacy programme by Microsoft India ltd. ieg.ignou.ac.in/wiki/images/b/b1/File_-_105_(DLTP).ppt.

[26] Digital literacy project–The East West foundation of India. tewfi.org/documents/Digital-Literacy-Brochure.pdf.

[27] Project Jyoti-Microsoft community Technology skill program me. www.microsoft.com...Transforming Education.

[28] *Op cit* 5.

government level in U.S. was in 2002 Maine learning Technology Institute (MLTI) and is still continuing to provide professional support and laptops to all the 7th and 8th grade students and their teachers and this programme was extended to high school in 2009. Internet access has been extended to schools and some states are providing many softwares for computing from the information from various data producing resources. MLTI initiative has spurred a private enterprise to adopt a programme of one laptop per child. By developing a cheaper version of laptop and exporting the same to third world countries @one million beginning 2008. South Korea resolved to do away with the paper based text books and school curriculum beginning 2011[29]. Even in India many initiatives have been taken to equip schools with computers and also to provide free computers to students. Municipal Corporation of Delhi would provide as many as 1,98,000 computers each costing ₹2,000/- to students of class of iv in the schools[30]. Government of India has an initiative of one laptop per child (OLPC) since 2011 and has been promising to deliver "Aakash" tablets at around $30 whose price would ultimately drop to $10. Aim of the initiative is to link 25,000 colleges and 400 universities on e-learning programme. Though there have been initial hick ups in in supply and stability of design, The Ministry of Human Resource Development has gone ahead innovating Aakash 2 in April 2012. Indian government hopes to produce Aakash for export market also. On a visit to Turkmenistan in September 2012, the Indian Telecom Minister Kapil Sibal suggested firming a joint venture company which may manufacture Aakash. Indian side would design software and hardware of the tablet suiting the Turkmen side's needs. The joint venture company could enter export business internationaly[31]. The most populous state of U.P has initiated a programme to distribute laptops to all students (17.98 lakhs) who after passing intermediate join higher studies in India. A sum of RS 1000 corers has been earmarked and tendering process had been set in motion with a view to starting distribution in mid-November 2012[32]. Computer centres are coming up in Urdu medium schools also. West Bengal government has placed in position a

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[29] *Op cit* 5.
[30] MCD to provide 198,000 computers to school kids – India Today online,0000.22,2011.
[31] Wikipedia/Aakash (tablet).
[32] India today.in/study/uttar-pardesh-goverments-laptops-for-students-akhilesh-yadav.

new IT policy in India with emphasis on job oriented computer literacy programs covering the entire state with fiscal incentive for backward areas[33].

Dr Ritu Dangwal[34] in her research paper has projected the result of an experiment through Minimum Invasive Education (MIE); an idea of Dr Sugat Mishra when a PC is left embedded in a wall to observe what children would do with it hoping that groups of children when provided appropriate resources will attain computer literacy with minimum intervention. Through a study spanning a period of three years and spread in different zone of the country, it has been observed that the groups of children can learn to operate computers with no adult interventions. Those groups of children who were exposed to MIE performed better in schools that the groups who were not. This study provides an important policy indicator that provision of basic tools for computer learning to the target groups would it self be trigger towards computer literacy even without significant instrumentation and prepare such target groups for faster learning under the guidance of skilled teachers when available. In fact one looks back at the process of growth of traditional skills among the societies, the trigger comes through the childrens' familiarity with basic tools of the trade in their surroundings when they are growing up.

As a first step to bridge the gap is to provide basic computer tools liberally at various stages to the targets groups. In different countries such approach is being adopted more and more particularly when hardware prices are falling and more and more applications are being provided free on internet. As the computer access is facilitated, there would be compulsive demand for measures for students' achievements that address the digital economy and knowledge explosion. So there would be greater need for rewriting of curriculum in schools and in institutions in digital languages. The employers would also be testing the prospective employees suitably trained or capable of being trained to take on the challenges of expanding knowledge.

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[33] Articles. Times of India.Indiatimes.com/keyword/computer literacy.
[34] Public computing, computer literacy and education outcome: Children and computers in rural India by Dr Ritu Dangwal-hole-in the wall.com/doc/paperie.pdf.

There has always been an inertia when need of the hour is to change rapidly to make use of opportunities being offered. There are associated constraints to move from one stage to another rapidly. It is feared that the entire educational system would not be able to come out of the conventional system of education and at the same time there would be facilitating initiatives for the significant portion of the system leaping into 21st century thinking. Such a gap or diversion would be a cause of significant tensions in the society with the trappings of the scenario of gilded age. This would continue to pose a challenge to the political and administrative class to widen the concept of inclusive growth to include the element of inclusive digital progress as well and devise enabling solutions continually to keep the conflict potential within manageable limits.

Thus the scenario of development becoming more and more uneven with the onset of ICT technologies remains unaltered and perhaps has become acuter when we reassess their impact in 2012 and with no assurance in site that unevenness in economic attainment would subside with the whirl wind of technology engulfing the society.

Despite the strong information base and knowledge base, many events taking place in the world lead to conclusion that it has not been possible to overcome determined ignorance and pre conceived prejudices and the volume of prejudices remains undiminished. The role of rumours in spreading misinformation and distrust among communities gets multiplied manifold and in multi seconds because of the facilitating technology of spreading information fast. The prejudice and rumours are strengthened by the power of ignorance that is determined not to know better. Over the years despite information deluge being available to have correct perspective there is increase in hate crimes. More information is capable of being viewed and applied differentially. For greater good and largely for the reasons of perceptional difference among the individuals and society the information sometimes need to be checked because not all truth sets us free and not all information can carry air of presumptive righteousness. By setting the information free in its rawest form, Wikileaks shows that truth too has limits on its value. Wikileaks makes the truth

pornographic by making it titillating display of undifferentiated waves, a laying bare of the inner for the satisfaction of the sight alone[35].

The greater penetration of market into media and the democratization of information, not just in terms of being able to access but also being able to broadcast it, the default belief in its inherent and limitless legitimacy needs to be re thought. Media because of various factors is controlled by certain interests and hence their coverage is with filters in position. Truth is relayed in many forms and each claiming it to be the only truth and thus the recepient of the information is left to keep on guessing about the exact. At the same time social media triggered by its own motives is free to circulate in the name of freedom of expression even rumours that address the deepest anxieties of vulnerable. In the era of information in plenty, not regulating the freedom of expression in any way may not be as romantic an idea as it once was[36].

Many governments including government of India have expressed a need to censor the internet and social media. Such moves have been criticized vocally and have been described as non-feasible. Faced with criticism on this score, an attempt has been made by government of India through Sam Pitroda, a key advisor to Prime Minister Man Mohan Singh. He took to twitter to answer to how information can be "democratized" as availability of information brings about openness, accessibility, transparency, accountability, networking, decentralization and as a result of democratization Pitroda recounted the resolve of government to build a robust information infrastructure to democratize information on a scale that has never been done before. He admitted that at present internet access was costly at this stage and would become cheaper with the availability of broader band-width as Government establish a National knowledge Network, connecting 1,500 nodes of universities, collages, research and libraries and 2.5 lakhs panchayats would stand connected through fibre optical cable. Government is making available information freely on its websites admitting that sensitive information would be continued to be

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[35] City City Bang Bang, Information as verses by Santosh Desai, Times of India Delhi Aug.20,2012;
      section times city page-6.
[36] *Ibid*.

controlled. Government has been issuing guidelines to its formations in improving its engagement with netizens and social media[37]. An initiative of this type by government should be continued on a regular basis so that the confidence of social media on the information being presented by government is seen to be relied on more. Perhaps such a mechanism may place the perspective of the government in correct frame and in more acceptable form. Censorship move on the other hand would be counterproductive and perhaps would have backlashes of unmanageable scales.

Thus with the free and plentiful availability of information capable of being manipulated and transferable at electronic speed, the challenges of society in managing the impact of misinformation and disinformation has become manifold particularly when the minds are prejudiced and refusing to come out of ignorance. The task has become complexer in direct proportion to the advancement of technology relating to information. Thus the misgivings on the impact of information age on societies in relation to their conflicts has become sharper than that what was foreseen by the UN study in 1997 reffred to in the beginning of this paper. Potential for invasion of people's' privacy has continued to increase with the advancement of digital technology and with increasing capacity to mine the data. Citizen part with personal information, for availing of certain vital services, which gets sold traded and monitored by different groups for their use which may not always be in the interest of the citizen for his security and or his business. It is feasible to keep a track of movements of the citizen and also of communications that individual makes and also of his contacts and the contacts of his contacts and their movements as well. Citizen's living style, pattern of purchase and the groups of friends and his social morality all are available. Data login, a U.S based data mining company, has been engaged by Facebook to study the efficiency of advertisements appearing on its social sites and in the process all the users of Facebook and their contacts stand scrutinised in relation to the purchase made by them. An attempt by the groups seeking to restrain the tracking of the individuals is resisted through lobby groups as

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[37] Sam Pitroda's twitter conference: Government for democratization of information, Times of India, Indiatimes.com/tech/socielmedia/same-pirodas-twitter-confrence26.09.2012.

such restraints are seen as threat by the big business led by Google, Microsoft etc[38]. Undoubtedly even the states also have to face such dilemmas when the information sought to be kept away from the public domain in larger public interest gets in the hands who are inimical to its sovereign functions. Similar threat is faced by the corporates and business entities in regard to the security of their vital data which should not be in the know of their rivals present and potential. Privacy concerns as reflected by the U.N study in 1997 remain as prickly as ever and are becoming acuter by the day with no solution in site.

With the advancement of information technology, the political parties are losing their face to face contact with their workers down the line. Warmth of personal contacts and face to face dialogue is disappearing. Ideological base among the followers is sought to be developed by one way communication and thus does not get rooted as strongly as would have been if the interaction had been face to face and that too frequently. The latter mode gives birth to loyalty between the cadre and leadership which is nurtured on mutual trust and admiration. The developing scenario is giving rise to armchair politicians whose practice in ideology is fragile as it has not been seasoned through the one to one questioning by the cadre and is thus always shaky and capable of being shifty. The leadership is seeking to manage their cadre, the people and opinion makers and interest groups through media management and through the distribution of spoils and doles out of the harvesting such leaders make by cornering public resources in their favour or in favour of their cronies. Thus the levers of democracy stand manipulated weakening the cohesiveness and integrity of the society. In a real crisis situation, which in any case would keep on a developing in a system bereft of ideology and loyalty, the leadership gives way leaving the events to be manipulated at lower formations and thus the regional centres begin to dictate the central leadership. Such a situation ultimately is bound to create concentric circles of powers some moving clockwise and some anticlockwise. In any case many centrifugal forces would be free to come into interplay. Such a scenario of political management may be found wanting in

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[38] Facebook-Data login deal raises privacy fears-Times News Networks: The Times of India, DLI September.26,2012, section: Times Buisness:Page.23.

managing the challenges of technology seeking to create inequality of different ways including economic inequalities. The political parties and emerging groups who wish to engage in political activities need to reform themselves to suit to the new cultural challenge being wrought by the technology without losing site of the basic tenet of political practice of being in touch with public and channelizing their action and thought processes based on an ideology which appeals to their minds. Ultimately the society would be stabilized on the foundations of ideologies and supporting institutions. Advancing technology should be sustaining and nourishing society and society in turn should be ready to adapting itself to take best out of the technology through timely synergetic interventions and correction through its institutional frames.

The need for the above approach was fairly enclosed by The UN study of 1997 referred to in the beginning of this paper. In the context of advancement in information technology as on date, the approach stands further reinforced.

The march of information technology will continue with rapid speed in years ahead with the increasing availability of information and capacities to store, process and analyse the emerging data, with the increased the analysis of the emerging data more and more economic values would be generated resulting in opportunities ad infnitum and that too for all disciplines. Evidently there would be continuous social changes which the society should be managing as it has managed in the past benefiting from new insights and opportunities that the changing technology itself would be generating. Management of social changes would also be technology based albeit on the strength of dynamic changes adapted by the institutional framework of the societies.