INFORMATION NEEDS OF 21ST CENTURY CHALLENGES AND PROSPECTS

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EDITOR'S NOTE

This is the text of the fourteenth ISTE Karnataka Convention Commemorative Lecture delivered by Prof. U. A. Rao at XXV Annual Convention of ISTE at Nagpur.

This deals with Satellite Communication Revolution that is taking place in the world with special reference to India and emphasises that Information Technology will govern the shape of things to come. The future will depend not on physical and natural resources, but on knowledge and information and its application.

1. INTRODUCTION

I am indeed grateful to the Indian Society for Technical Education for inviting me to deliver the Karnataka Convention Commemorative Lecture for the year 1995. The exponential growth of science and technology in the last fifty years has undoubtedly resulted in the extraordinary information explosion, rapid dissemination of which has become vital to prevent ossification of our society. The remarkable developments in space and computer technology, since the advent of space era four decades ago, have dramatically shrunk time and distance and brought in the awareness of the oneness of our unique fragile planet, that of a global village. Yet the conflict between selfish national interests and the ideological planetary view of globalists continues to perpetuate the inequities and imbalances between the North and the South, the haves and have nots and the affluent and the deprived, making a mockery of the concept of the global village. The power of knowledge is being adroitly used to exploit the weaker and vulnerable societies, who unfortunately have yet to grasp the significance and technological challenges of the information revolution brought about by the extraordinary accelerating changes taking place which have made most of the past ideas, notions and policies archaic, outdated and technologically irrelevant. A true appreciation of the challenges and prospects of the information needs of 21st century alone can enable all nations to initiate appropriate development strategies for meeting even the basic needs of their growing population.

The evolutionary growth of human intelligence and civilization is universally attributed to two most fundamental extra-genetic characteristics-that of cognitive intelligence and syntactic speech -which have enabled humankind to vectorially develop their science and technology. In a world of exploding change, organisational relationships and

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life style of individuals and societies have been primarily governed by the state of technology development. **It is universally recognised that technology is the greatest gift of god to humanity, next to life itself.** While historically the agricultural revolution which launched the first economic revolution 10,000 years ago was followed by the second wave industrial revolution 300 years ago, it is the third wave information revolution initiated by the so called Information super-highway resulting from the phenomenal developments in space technology that has virtually demolished the geographic, cultural and social boundaries across the entire world. Unless the socio-political systems in the developing nations, already burdened with 75% of global population and suffering from lack of resources and capital, massive illiteracy, poor agricultural productivity, inadequate industrial infrastructure, environmental degradation and rampant pollution of poverty are able to free themselves from being prisoners of their own limited horizon, their very survival in the 21st century would be jeopardised.

Increase in green-house gases, large scale deforestation, depletion of ozone, global disease of environmental pollution, negative repercussions of green revolution, mismanagement of land and water resources and effect of E1 Nino, ENSO and volcanic eruptions are causing short and long term climate changes worldwide, clearly establishing the global inter-connectivity and dependence. Modern day earth observation satellites are providing data in the order of 20 trillion bits per day and at this rate accumulated archives of data by 2005 will exceed 150,000 trillion bits. This has naturally led to the demolition of the second wave industrial society based on mass education, mass distribution, mass media and mass entertainment to a new and increasingly demassified society characterised by highly sophisticated knowledge centres, customised services, specialised production centres and segmented niche markets. While in the past, predominantly agriculture based nations endowed with rich natural resources had comparative advantage, in the energy integrated knowledge based world economy the comparative advantage has shifted to those countries which are determined to absorb, adopt and assimilate the spectacular developments in science and technology and harness them for their national development. In the ilberalised post GATT era, where governments, societies and individuals need to quickly respond to events and situations to enable them to compete in the global market place of interdependent economy, the paramount need is for timely collection, synthesis, analysis and dissemination of the vast data bank of information gathered from multiple sources. In the words of Oltean **"The Paradigm of today is the Neoency - clopedism. It is essential to have information on information, the so called secondary information. In this technology era, data bases are our modern encyclopedia."** It is self evident that at the centre of the age of information superhighway is satellite based communication, which has single handedly brought about a new communication revolution across the globe.

2. HISTORICAL GROWTH

Communication which reflects **the culture of today and shapes the future of tomorrow is at** very root if the progress of human society. The evolutionary growth

of communication, which truly began with the invention of the printing press by William Caxton in 1476, made the first quantum leap with the discovery of telegraphy and telephony by Graham Bell in the late 19th Century, even though its widespread use became a reality only after the second world war. The coming of the radio at the turn of the century and its rapid expansion initiated the first major revolution in the history of communication. Electrical communication, compared to the early traditional horse and railway system, not only increased the speed of communication by a factor of 10 million, but also made itself accessible even to a common man thus heralding the beginning of mass communication. Rapid communication explosion since 1940, following the widespread use of telephones, telegraphy, radio and TV for providing information, news and entertainment instantaneously to all parts of the world, took a revolutionary quantum jump with the introduction of communication satellites in the 1960s.

It took more than half a century after Tsiolkovsky's presentation of his ideas on the feasibility of artificial satellites circling the earth, before the recognition of the possible use of such satellites for global communication and broadcasting. It was left to the great visionary Arthur C. Clarke to point out that an artificial satellite at a distance of about 35,800 km from the earth would make one revolution every 24 hours, and hence would remain stationary above the same spot on the earth providing communication visibility for over a third of the Earth's surface. Three repeater satellites, 120 degree apart in the geostationary orbit, could provide television and microwave coverage to the entire planet, in 1945, when this concept was first proposed, the artificial earth satellites were still in the realm of science fiction. Today, in less than fifty years from that enunciation, artificial satellites are supporting a multi-billion dollar high technology international business and in fact are significantly affecting the life of mankind in several ways.

The successful relay of TV signals across the Atlantic in 1962 using Telestar, the first active repeater communication satellite, ushered the satellite communication era. By 1964 Syncom III, an experimental satellite, had been placed in the geostationary orbit. In the same year INTELSAT, an international consortium having the objective of setting up a global satellite network for fixed telecommunications, came into being. By July 1965 the 'Early Bird' satellite (INTELSAT-1) was in operation, relaying telephone calls between Europe and North America. The remarkable developments in space communication in just three decades since then has brought us to the threshold of achieving the capability of establishing human connectivity anywhere in the world, on land, air or sea. The inherent advantage of satellite communication systems, which can cover wide areas from their vantage point in space and establish extremely reliable connectivity even with distant and inaccessible areas, makes them ideal for point to point, point to multi-point and for multi-point to point applications. Satellite networks not only offer a high degree of flexibility to meet the requirements of changing needs through reconfiguration but also have the distinct advantage over other media because of their ability to aggregate small requirements spread across vast territo-

ries to provide cost effective specialised services.

The evolutionary nature of satellite communication is reflected in their capacity increase, from just 240 voice channels in 1965 to the present day satellite which on an average easily carry over 20,000 voice circuits, along with several TV channels. This remarkable growth is well reflected in the growth of INTELSAT, which has gone through generations in just three decades and is now operating more than 800 earth stations located in over 180 countries and territories. Practically all the developing nations in the world today have take advantage of satellite communication by either leasing transponders from international systems like INTELSAT, INMARSAT and INTERSPUTNIK or through their own dedicated national satellites. In spite of this significant achievement, while one out of every two persons has access to a telephone in the developed countries, corresponding facility even in the metropolitan cities of developing countries like India is less than one for every 100 persons. The communication picture in the rural developing areas is even more dismal, where over 2000 persons have to compete for access to a single telephone. Only 20 out of the 170 geostationary satellites in orbit today belong to the developing nations, which account for three quarters of the world population. At this rate, even by the year 2000, the share of the developing countries either in leased transponders or in terms of dedicated satellites is unlikely to exceed 15% of the global usage.

3. SATELLITE COMMUNICATION REVOLUTION IN INDIA

Realising the potential benefits of satellite technology ISRO initiated a number of studies as early as 1962 and arrived at the conclusion that the most cost effective practical solution to our problem lies in the adoption of a hybrid system which combines rediffusion from ground stations for areas having large population density and direct satellite broadcast system for catering to the needs of remote rural areas. The inauguration of the year long Satellite Instructional Television Experiment (SITE) in August 1975 marked a major milestone in harnessing satellite technology for taking audio visual education to remote rural villages. The significance if this experiment arises from the fact that direct reception television, as a concept was tested for the first time on such large scale.

Following the successful conduct of SITE in 1975-76 using NASA's ATS-6 satellite to promote rural education in health, hygiene, better agricultural practices, family planning etc. and successful launch of the indigenously developed experimental communication satellite APPLE in 1981, India embarked in the development of operational multipurpose communication satellites INSAT. The four, first generation INSAT-1 satellites were procured from Ford Aerospace Communication Corporation, of which INSAT-1B from 1983 to 1991 and INSAT-1D since then have been used to provide long distance telecommunication, nationwide TV, radio networking, data relay and meteorological services. The successful launch of totally indigenously built second generation INSAT-2A and INSAT-2B, each having about 50% more capacity than INSAT-1 system and the successful launch of INSAT-2C a month ago, mark the complete mastery of ISRO in the state of the art

satellite technology.

INSAT system, with over 5000 two way speech circuits covering 140 routes amounting to 150,000 route kms initiated a communication revolution in the country connecting for the first time, even remote rural areas and off shore islands with the main stream of the nation using Low Cost Terminals (LCT). The nation wide geographic reach of INSAT satellite has been advantageously used for a variety of applications such as administrative, business and computer communications through a number of captive networks using small terminals. New specialised services such as PTI news service, facsimile transmission and emergency communication for post disaster relief operations have been commissioned. The highly innovative, pilot rural telegraphy network in the hilly regions of north-eastern part of the country with the hub station at Shillong and a number of rural telegraph terminals has been implemented. The National Information Centre's Network (NICNET) using VSATs and spread-spectrum techniques with over 700 micro terminals provides reliable data communication links inter-connecting district headquarters, state capitals, and central government departments. The Remote Area Business and Message Network (RABMN), to provide data communication between industries located in major metropolitan cities and their branches spread across the country is already operational with over 500 micro terminals and with a registered demand for more than 2000 terminals. Other VSAT based networks, such as UGC's Information Library Network (INFLIBNET) which envisages interconnection of the libraries of different Universities and R & D Institutions spread across the country, are under implementation.

One of the most innovative use of INSAT has been the implementation of the unique, unattended, locale specific Disaster Warning System (DWS) consisting of over 150 disaster warning receivers installed in selected, cyclone prone east coast areas of the country. The DWS implemented with INSAT effectively combines the communication and meteorological capability of INSAT to provide a unique humanitarian service, which has been in operation since 1987. Most dramatic demonstration of the DWS system was during the cyclone that hit the coast of Andhra Pradesh on 9th May, 1990, enabling the Government to evacuate over 170,000 people from the cyclone affected region, thus saving thousands of lives and livestock. Low cost VSAT services are now available to greatly help in providing assistance during other emergencies including earthquakes, as has been demonstrated in Mexico and the well-known Space Bridge telemedicine experiment in Armenia providing real time contact between local medical specialities accessible to the affected people. The Radio Networking Service via INSAT provides reliable, high fidelity, six channel national/regional feeds for retransmission by all existing 152 AIR stations. The cumulative monthly utilisation of the RN channels has already crossed 5,000 hrs per month. A Standard Time and Frequency Signal Dissemination Service (STFSDS) using a radio networking carrier is also available, round the clock, in a broadcast mode.

The communication revolution introduced by the INSAT system has generted a great and unprecedented demand for the expansion of these vital

services in the country requiring rapid augmentation of space segment. Increasingly all over the world the future trends in communication is towards meeting the needs of the people at individual and group level. The coming decade will see a revolution in coding techniques and video compression techniques which can transmit video programmes at very low bit rates resulting in the most economical use of space segment. Keeping in view the emerging global scenario, INSAT-2C and subsequent satellites have been reconfigured to carry additional Ku band transponders, in addition to the use of advanced modulation and multiple access techniques such as TDMA, DAMA and digital speech interpolation.

4. EDUCATION - DRIVING FORCE OF HUMAN LIBERATION

The existence of a close organic linkage between development and education is clearly reflected in the linear relationship between the illiteracy index of a country and its gross national product. Least developed countries with illiteracy rate of 70 to 80 percent have a meager per capita income of less than $200 a year, compared to $600 per year of middle income group nations with illiteracy rates of 35-50% and over $10,000 annual income enjoyed by developed nations having less than 5% illiterates. Eradication of female illiteracy, in particular, is vital for the development of the nation. Analysis of data of over 160 developing countries or even our own different states in the nation clearly indicates that the crude birth rate is as high as 36 per thousand in areas having 80% female illiteracy as against less than 18 per thousand where female illiteracy is less than 10%. Vast improvement in children's health, nutrition and infant morality rate are directly related to the level of female illiteracy. Recent study indicates that 50% of the schools in our country catering to about 150 million school going students cannot even boast of having a blackboard, let alone library or laboratory facilities. Consequently, only one-third of our industrial work force is literate, less than a fifth of which are matriculates, which is one of the major reasons for poor industrial productivity. The task of providing productive employment to 10 million people every year in the organised manufacturing sector can only be accomplished through planned expansion of industrial sector which requires adequate supply of literate work force.

In spite of the green revolution the agricultural productivity in the country is just around 1.6 ton/ha. as against world's average of 2.6 ton/ha. leave alone the world's best of 5.4 ton/ha. Extensive deforestation, total mismanagement of top soil and water resources, negative repercussion of the very green revolution have degraded practically 50% of our total arable land, turning some of our most fertile areas into saline and alkaline deserts. Even with the reclamation of about 20 million ha. of cultivable wasteland with appropriate agricultural practices and full exploitation of the total irrigation potential which can be doubled to 80 million ha. the agricultural output can at best be increased to 250 million tons a year with the present agricultural practices. The tasks of increasing the annual agricultural production to about 450 million tons in the coming decades to meet the basic minimal requirements of the projected population of 1.8 billion by 2050, requires targeting of crop yield to 4 ton/ha. This is well within our technological capability provided we

are able to initiate substainable integrated development strategies at the microlevel of watersheds using the vital information inputs from space technology and biotechnological advances. However, unless the farmers at the grass root level are educated to appreciate and implement better agricultural practices, sustainable development will remain a dream and the country will have no choice but to witness the colossal tragedy of millions dying of naked starvation in the coming decades.

The total outlay on education including higher education and sports is less than 3.5% of our GDP, which is hardly conducive to build the technological society of the future. Unless eradication of illiteracy is tackled on a war footing and not by mere populist slogan adoption, the present level of illiteracy of 35% would continue which essentially means that by 2050 India would have over 600 million illiterate people who cannot meaningfully contribute to the development of our nation. Most dramatic impact of INSAT has been in the rapid expansion of TV dissemination in the country through installation of more than 600 TV transmitters providing access to over 80% of India's population. Additionally, 35,000 direct reception sets are now in operation to provide TV services to very remote population. Regional Networking Services have already been implemented practically in all the States of the country. Use of transportable earth stations such as Satellite News Gathering (SNG) vehicles now enable extensive real time coverage of all important events in any part of the country. INSAT is being used for Educational TV broadcasting with about 100 hours of programme per month to about 4,000 schools and colleges. The recent dedication of a full transponder to IGNOU for providing distance education to the open university students is a welcome step in the right direction. However, when we compare our efforts with those of China which uses the satellite medium to provide 31 hour adult educational programmes every day to 30 million people with 6300 TVRO earth stations and over 50,000 learning centres, it is clear that our socio-political system has failed to grasp the power of distance education facilities for eradication of illiteracy, in spite of the fact that India today can compete with most advanced nations in terms of its satellite technology capability.

An effective educational system requires not just a one way system of instruction but a two way interactive communication system enabling the target audience to ask questions and obtain clarifications from experts, in real time. Special inexpensive talk back facilities have been developed within ISRO to promote this activity in the country and a few selected large scale experiments have been conducted to demonstrate the effectiveness of the satellite media for imparting interactive education. Two such experiments involved the rural sector for providing relevant educational instructions to rural officials, social workers and teachers in the remote Rupal Village of Gandhinagar district in Gujarat and imparting instructions on appropriate agricultural practices to farmers in Bhiwani District. Likewise, ISRO-UGC and ISRO-IGNOU experiments with the participation of students in a number of locations across the country and experiments involving a number of widely dispersed industries as well as banking institutions for

providing refresher courses were also successfully conducted. While these experiments demonstrated the paramount importance of adopting such an interactive system for rapid dissemination of education, eradication of illiteracy as a goal requires the use of dedicated satellites, specially tailored to effectively disseminate culture and region specific information to each individual language groups and regional entities for transforming our rural society.

5. FUTURE SCENARIO

Recognising that eradication of illiteracy is the single most important factor which can contribute to the overall development of the nation, ISRO conceived of developing and launching dedicated GRAMSAT satellites, carrying six to eight high powered C-band transponders which together with video compression techniques can disseminate region and culture specific audio visual programmes of relevance in each of the regional languages through rebroadcast mode on to an ordinary TV set. The high power in C-band will enable even remote area viewers outside the reach of TV transmitters and special group of people to receive programmes of their choice in the direct reception mode with just about 2m antenna. Addition of 2 or 3 high power spot beam Ku-band transponders to GRAMSAT will further enhance this capability by permitting direct reception to be achieved with just 0.8 m antenna, which is particularly useful for providing continuing education for industrial workers in urban areas.

The coming decade will see revolution in coding and video compression techniques which permit transmission of video programmes at very low bit rates for most economical use of space segment. It is now possible to transmit six to eight TV channels on a single transponder. Availability of about 150 channels from a single satellite location can entirely change the complexion of home entertainment. The spectacular developments in satellite technology allows dynamic allocation of bandwidth in each transponder for multiple channel transmission, by automatically adjusting the bandwidth requirement depending on the information and frequency content of the programme. Capability to electronically switch spot beams at will on a dynamical basis with complex antenna systems to cater to various specific requirements has further enhanced the flexibility of satellite communication systems. The developments in optical fibre cables have also not lagged behind, which with Erbium doped OFC's can now directly transmit high fidelity information optically with repeater stations spaced almost 500 km apart. Video-on-demand which includes specific group interest programmes in addition to general entertainment programmes, allows individuals to choose and even manipulate programmes of their choice, making direct to home television a reality. The availability of TV using only a small space segment resource in an economic way can also have a dramatic impact on satellite based educational and developmental services. What was cost prohibitive yesterday has become affordable today. GRAMSAT incorporating some of these advanҫes is expected to efficiently tackle the problem of rural illiteracy and remote area development.

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view the emerging global scenario, INSAT-2C and subsequent satellites have been reconfigured to carry additional Ku band transponders, in addition to the use of advanced modulation and multiple access techniques such as TDMA, DAMA and digital speech interpolation. On the telecommunication front, the use of VSAT networks will continue to grow for business and rural communications. Innovative use of VSAT is bound to result in several value added services being introduced, including video conferencing and other multi-media services. Creation of data bases catering to group and individual requirements and providing easy access to the same will be one of the major thrust areas in the future.

The land mobile satellite systems with small mobile terminals are presently entering the operational phase to meet the requirements of the transport sector, emergency communications, and remote area communications, in a big way. This service is the precursor for satellite based personal communication systems of the future, which is likely to emerge as one of the major services in the next two decades. Several Low Earth Orbiting (LEO) satellite systems such as the Iridium system of Motorola, Global Star of Loral, Odyssey of TRW, ORBCOM of Orbital Sciences Corporation and INMARSATP are under different stages of implementation for providing data, messaging and voice services for millions of users across the globe. ISRO has decided, as an interim measure, to increase the coverage of high power S band system beginning with INSAT-2C to establish at least a skeletal nationwide mobile communication network.

Information on demand, video on demand, bandwidth on demand, direct to home television, are some of the buzz words of the age of the information superhighway, implementation of which on a selective basis are essential to enable India to successfully compete in the global market in the liberalised atmosphere. These technological advances in turn demand appropriate restructuring of economic, social and organisational patterns, a clearer appreciation of the knowledge driven globally-integrated economy and rapid development of flexible, pulsating organisations tuned to face the global challenges. While the technology required has been developed in the country, the question really is whether the socio-economic structure is geared to seize the initiative to enable the country to rise as a giant in the international economic scene.

6. ROLE OF ENGINEERS - CHALLENGES AND PROSPECTS

Realisation of a vibrant technological society of the future crucially depends on our ability to think rationally, discard outdated views and charter new pathways based on total self reliance. More than anything else, it requires infusion of self confidence that we are no less intelligent than a white man and our young engineers are comparable to the best anywhere in the world. The hall mark of all the sophisticated modern technologies is their distinctly multi-disciplinary nature, which unfortunately is not appreciated in our educational institutions which still continue to follow the pattern of the 1950's, a carry over from the colonial days. The fact that less than 1% of our GDP is spent on research, which in practical terms is just about $4.5 per capita has only encouraged mediocre research in our

institutions of higher learning. **Quantity has replaced quality, excellence has been sacrificed for favouring mediocrity, imitation has been encouraged at the cost of innovation and only lip sympathy is expressed at the sight of our bright engineers leaving the country for want of recognition.** As Alvin Toffer said, we have to realise "The technology of tomorrow requires not millions of highly lettered men, ready to work in unison at endlessly repeated jobs, not men who take orders in unblinking fashion, but men who can make critical judgements, who can weave their way through novel environments, who are quick to spot new relationship in the rapidly changing reality." We must recognise that mediocrity can only multiply mediocrity and can never delivery excellence.

The future vision of India must be based on the adoption of a holistic approach requiring integration of the fruits of its scientific research into the industrial fabric of the nation to meet the requirements of the society at large. The total spectrum of activity required for achieving this objective encompasses a large cycle which includes basic research, applied aspects, product design, process development, production engineering, quality control, aggressive marketing and efficient management. Unless we are willing to attempt a fundamental change in our outlook, replace the age old tradition with a dynamically changing curricula, provide an in-depth understanding of the latest innovations and industrial needs, our educational institutions will not succeed in producing competent T shaped engineers of the future who can effectively blend their specialisation with the broad spectrum of opportunities and requirements.

Continued dependence on imported technology, encouragement of kit culture and the black box approach adopted have resulted in our industries becoming outdated and uncompetitive in the global market. The greatest harm to the country has been done by propagating the concept of import substitution which has led our scientists and industries becoming imitative instead of innovative. Unlike in countries like Japan where over 50% of total R & D expenditure is contributed by industries, which has resulted in a dramatic improvement in the quality of their products and services, our national undertakings have thrived by enjoying subsidies and protection in a limited captive market making only marginal investments in R & D. While protection and subsidies may be called for in the initial growth period, indefinite continuation of such support has only added to the overheads, ushered a false sense of complacence, retarded development, encouraged continued dependence on borrowed technology and has killed the very spirit of innovation making most of our public sector undertakings a gigantic drag on the national economy. Neither the public nor the private sector industries have initiated R & D in cooperation with institutions and universities nor the latter have shown any inclination to forge a dynamic partnership with industries. Unless the pathetic situation is changed, industries are forced to spend at least 5% of their sales turnover on R & D half of which must be in cooperation with universities and institutions, liberalisation will only end up in the exploitation of the nation by massive entry of multinationals into the country.

We must implicity recognise that

science and technology is the most powerful currency of power employed by developed nations to exploit the developing ones. The only way to counter the technological hegemonism is through systematically building up self-reliance. Establishment of a meaningful partnership triad between industries, institutions and universities will not only improve the quality of products but also help the universities in making them more responsive to the market demand and enable them to produce the future technological generation. The prospects of squarely meeting the extra-ordinary challenges facing the country of exploding population, poor agricultural productivity, inadequate employment opportunities, industrial backwardness and poor quality of life entirely depends on the ability of our socio-political system to encourage self-reliant excellence in identified areas of national priority.

7. CONCLUSION

Rapid communication, massive education and speedy information gathering and dissemination are the fundamental requirements for the development of the complex modern society. The phenomenal growth of satellite communication technology and the novel concepts that are being generated have opened up, for the first time in the history of man a vast spectrum of opportunities which can transform entire societies. In this technological age, it is self evident, that it is only technology which sets limit to man's activity and defines the state of his cultural and economic evolution. It is important to recognise that it is no longer the resource which limits decisions but decisions which can create resources. The merging of large computation and communication capabilities through technological innovations are paving the way for establishment of seamless network to provide personal communication and multimedia services thus creating a world where communications, information, entertainment and motivation are literally at the will of one's finger tips. While the challenges facing our future generation, educational institutions and the industrial establishments may indeed be very great, they are well within the capability of this nation, provided we are willing to face them squarely and solve them with a single minded devotion. Introduction of new technologies and services always tend to create ripples and in some case upheavals in an established social fabric. Notwithstanding, by exercising wise caution and demonstrating sensitivity to social, cultural and political nuances of different societies, implementation of new technologies can lead to a smooth transition of the country as a whole to enable the benefits of technology to reach all sections of our society, particularly the vulnerable population of the nation.

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