

TOWARDS A
TELECOMMUNICATIONS
REVOLUTION IN INDIA

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"Free Enterprise was born with man
and shall survive as long as man
survives."

— **A. D. Shroff**

1899-1965

Founder-President
Forum of Free Enterprise

TOWARDS A TELECOMMUNICATIONS REVOLUTION IN INDIA

By

T. H. CHOWDARY*

North America, Japan and Western Europe are becoming post-industrial information societies. The proportion of the work-force engaged in food or goods production is going down, and that engaged in the tertiary sector, i.e., services, is increasing. The impact of technology and knowledge cannot be inhibited from influencing even the developing countries. In them, especially in India, in and around certain cities and among the emerging affluent sections of the population, there are the same needs for information and knowledge as generally obtaining in the affluent countries. The storage, retrieval and processing of information and its conversion into knowledge for decisions, is of strategic importance for efficient and effective conduct of economic activities, whether they be in business, industry, Government, administration or in

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plain, modern urban life. Revolutionary advances in electronics and telecommunications have made it possible for a qualitative transformation of the world's telecommunication networks which now can be likened, in regard to information transportation, to railways, roadways, airways and waterways for the transportation of material goods. Information which was committed to books can now be "electronified", stored in computer memories, or data-bases, up-dated, accessed and processed over telecommunication pathways, called "channels", from anywhere in the world. This is opening up the fascinating prospect of world-wide information becoming available to any person with a Personal Computer (PC) hooked to the telecom network. Information and knowledge are power. Power in the hands of everybody is an unprecedented phenomenon. Wise and responsible Governments will and can, use this knowledge-based power of every citizen for the good of the individual, the society, the country and the human race.

There are nearly 700 million telephones in the world. Their number won't increase in the affluent countries (U.S.A., Canada, Japan and Western Europe). They are very fast increasing in South East Asia, and a little slowly in Africa. The Communist countries are now waking up to the potential of information and knowledge in the hands of every citizen for greater productivity and better economic performance and more efficient utilisation of natural resources. Concurrently with the affluent countries, but at a slower speed, is the increase in intelligent terminals, call them "Personal Computers". Thanks to the falling prices of microprocessors and electronic memories, these are being embedded in the customer premises.

telecommunication equipments and these terminals are becoming multi-functional, i.e., good for use for telephony, telex, facsimile, data transmission, electronic mail, and stored text. In the world, there are about 50 million Personal Computers, growing at about 30-40% per year. Previously, telecommunications meant telegrams, telex or telephony, and humans were communicating with humans. With the emergence of Personal Computers in every business and in every home, they need to communicate with one another, i.e., machine to machine, and they being intelligent, it is possible to communicate between machines and men, and men and machines. This is not fantasy. A Japanese can talk in that language in Tokyo, but he could be heard in English in the United States and vice-versa. Because the traditional post, dependent upon manual labour, was becoming costlier and inefficient, and now that all text can be electronified and also transmitted electronically, facsimile is gaining. Once the telex was invented, the telegram started declining, and now with the facsimile machines, especially by the simple addition of one more Printed Circuit Board (PCB) in a Personal Computer, telex will be overtaken and more or less extinguished by facsimile. So the facsimile terminals are increasing as fast as the Personal Computers themselves. Even in our country where the fax machine is very costly (upwards of Rs. 70,000, compared to about \$ 800 [about Rs. 14,000] in the international markets), and even when their use is negatively affected by the imposition of an annual fee by the Department of Telecommunications, they are gaining, and, amazingly, already about 40% of the telecom traffic from Japan into India is facsimile.

All over the world, information, whether it be an article on some aspect of life, of a scholarly paper in chemistry,

or statistical data, is all being electronified, put in computer memories (data banks), and is being accessed and extracted over the telecom networks. 4,800 data banks exist in the world today, and their number is increasing. The Videsh Sanchar Nigam commissioned its international Gateway Packet Switch recently, and with as few as less than 100 customers, 1,20,000 pages of information per month is being extracted. One can imagine if only we have a domestic Packet Switched Data Network (PSDN), how many more people will use it and how much the world's information would be readily available to our citizens (and how much increase when the "People's PC", costing about Rs. 10,000, is going to be available from the Electronics Trade & Technology Corporation). The Packet Switching System and Personal Computers in the customer premises would be supporting electronic mail, i.e., instead of people writing letters, they can compose the matter in their PCs and instruct the PCs to send it to other PCs, i.e., the addressees' PCs, which will store the matter in their Electronic Mail Boxes, to be retrieved by the addressees at their convenience. And, if the transmission takes place during "off-peak", i.e., night time, electronically delivered mail may be cheaper than physically delivered mail, apart from its being neatly instantaneous.

So far, telephone communications were between telephone instruments and by the medium of instruments between persons. In other words, a person has to walk to a telephone to telephone to communicate. Now are emerging telephones for persons - "Personal Phones". These can be carried in pockets. While a person is walking or travelling on land, overseas, or in the air, calls can be made and received. With the technology called "Cellular Radio" (currently analogue), less than a thousand pairs

of radio channels, by repeated re-use through computer control and assignment, are supporting upto 100,000 mobile phones. When the technology changes over to digital, in one city, telephones without wires and on the body of a person or in a car can be supported to the extent of 1 million. The telephone number would remain the same whether a person is in one city or roaming anywhere in the country. That is what is 'personal communication'. Facilitating this in future will be satellite 'personal' earth stations as small as about 30 centimetres in diameter. This is not fiction or fantasy, but is already being tried out. It is their mass production by revolutionary technology that can make personal earth stations available to the people.

What are the technologies and advances that are making such communications possible? First of all, starting from the transistor, it is the revolution in micro-electronics. Integrated Circuits (ICs), having less than a score of transistors on a chip the size of a finger-nail, were thought to be a great advance over discrete components, i.e., transistors, in the early 1960s. Today, 100,000 transistors on a chip is commonplace, and a million element and 4 million elements chips are about to burst on the market. The result is ever-increasing capability to store information and to process on chips; and the mass production of chips has brought down the price from hundreds of dollars to a few cents. The number of Millions of Instructions Per Second (MIPS) that a microprocessor can carry out has been increasing exponentially; and the cost has been tumbling. That is the reason why microprocessors are being embedded in every device, enhancing its capability and making it more versatile. The greater the density of packing, the less is

the fault liability and, therefore, with increasing integration are going falling prices, greater reliability, self-diagnosing and self-substituting and fault-signalling systems. It is said that if the aeronautical technology advanced as rapidly as the micro-electronics technology, a Concorde would be carrying 1 million passengers, of 1 million kilometers per hour at a dime a person across the Atlantic! At the beginning of this decade, the electronics and information industry was the ninth largest in the world. By the mid-1980s, it was the fourth, and by the beginning of the next decade, it would be the largest, relegating automobiles to second place.

The chip technology has also enabled every information, including speech and picture, to be transformed into digital (electronic) signals in contrast to analogue signals earlier. So, all information will be of one universal form, i.e., digital (current-no-current, signal-to-signal and a combination of such digits means one element of information). The information to be transported will be "packetised" and it is these packets that will be transported and switched from place to place, from origin to destination. This can be likened to containers having material or goods inside, being transported through railways or shipping lines or airways, without reference to what the container contains. The telecommunication networks consisting of transmission channels and switches, can be likened to roadways, railways, or airways, with the containers being switched from lorry to lorry, or from train to train, or from one airline to another airline, the difference being instead of mass, information will be transport Digital Switches are cheaper and more reliable. They require less skills and less capital to be produced, but great knowledge for their design.

However, the design itself is being helped by the computers. Their production requires less investment and, therefore, there could be multiple producers competing with one another. This is one of the reasons why the traditional view of telecommunications being a natural monopoly is being undermined.

In telecommunication transmission technology also, there are revolutionary advances. Beginning from 1965, a world-wide system of communication satellites has been forged. The INTELSAT (International Telecommunications Satellite Organisation), an international co-operative of 117 nations, is operating a global communications satellite system, with currently 14 satellites in the equatorial orbit. In the 25 years of its existence, six generations of satellites have been launched. While the first one had a capacity of 240 voice grade circuits and less than three years' life, the current ones are capable of giving 120,000 telephone circuits and remain alive in orbit upto 14 years. No wonder that the cost of an international satellite half-circuit has come down from \$ 32,000 per year to less than \$ 1,000 (with Digital Circuit Multiplication Equipment). The INTELSAT is envisaging that within the next 3-5 years, an intercontinental telephone equivalent circuit would cost no more than \$ 1 a day. What a contrast this is compared to the cost of an Indian telecom channel within the country. Because of repeated increases in domestic tariffs, 600 intra-city telephone circuits (between Madras, Delhi and Bombay) are priced at Rs. 38 Crores per year, compared to 2,000 international satellite-cum-cable circuits costing no more than Rs. 10

Crores per year!* The international trend is for telecom prices to come down by 10-12% per year. The technology of making satellites and launching them is spreading, with the result that today competitive launches are possible from the U.S. Governmental agency, the National Aeronautics & Space Administration (NASA), a few private companies in America, ARIANE, an European consortium, the Soviet Union, and the People's Republic of China. Very soon, Japan, Israel, Brazil and, perhaps, India would also be in the launcher market.

Another development is in optical fibers. No thicker than human hair, a pair of them can give over 7,000 telephone circuits, and several pairs in a cable are already giving 50,000 telephone circuits. More attractively, while the traditional copper conductor cables required repeaters under ground or under water every 10-20 kilometres, the

*The Indian telephones are priced out of reach of many. Technological developments helped prices to fall everywhere in the world - not here. For example in 1951, the ratio of per telephone revenue to per capita income was about 2.5. Now 37 years after, it is about 2.2! Contrast this with radio. Price of radio/per capita income ratio has come down from 1.6 to 0.067. What could be the reason? Could it be that telephones are a (Government) monopoly and radio receivers are not, that the latter adopted latest technology soon after it become available and that too competitively? Or take the price of an international telephone call, India-US for example. One minute is priced at Rs. 60 which is 1/60th of per capita income. In other words, an India-US call is 170 times less affordable by an Indian than an American. Even at simple exchange value of currencies, it is 1.8 times costlier for an Indian. Or if we consider only the highest paid say Rs. 10,000 per month in India and \$ 10,000 in US, one minute of India-US call costs (60/10,000) of the monthly salary; it is (1/5000) for the American. That is, it is 30 times costlier or less affordable for even the highest paid Indian compared to his US counter part.

optical fiber cables require repeaters only at 100-200 kilometre intervals ! Their costs are coming down. There is competition between optical fiber cables underground or under water, and communication satellite circuits.

Witnessing an information revolution - universal availability of information through the exploitation of computers and telecommunications by the ability to bring technology's benefits to the market quickly. That this could not be facilitated by the traditional telecom monopolies, has been realised by country after country. Within the last five years, at least 20 countries have indulged in extensive inquiry and have come to the conclusion that telecommunications are no longer "natural" monopolies, that the traditional Government monopolies should be given up, that they should be corporatised, and that they should be "peoplesified" progressively, i.e., instead of being State-owned, the people themselves can own them in competition with several companies in different sectors of telecommunications. Information services are different from the traditional telecommunications concept of simple voice or text conveyance. The extensive use of Very Small Aperture Terminals (VSATs) which are small earth stations using communication satellites, enables leap-frogging, i.e., whether it is a jungle, or mountain, or marshy area, if a human being can reach that place, so can the most sophisticated telecommunications facility through a VSAT. Companies and organisations are having dedicated VSATs for intra-Company, country or continent wide operations. The bottlenecks, infirmities and insufficiencies so characteristic of the traditional terrestrial telecom networks and electro-mechanical

switches, are being rapidly overcome. The fact that, in India, one per cent of the less than 5 million telephones are producing 30% of the revenues, and that 9 cities account for 50% of the telephone revenue, shows that these are very heavily dependent upon information and telecommunications and that these engines of Indian economic development deserve world-class telecommunications to give them the strength and competitive advantage for efficient conduct of commerce, trade and business. What is required is vision and patriotism, and shedding of sloganism, pride and monopolies progressively. Telecommunications are far too serious a matter to be severely left alone to the bureaucratic organisation or to engineers. The needs of users, of businesses, must determine how things could be done and how they should be delivered. An entrenched bureaucracy without any compulsion to change or to be sensitive and responsive to customers, is anachronistic and unpatriotic. Users, businesses, economists, intellectuals, policy-makers and people's representatives must all be involved in seeing that telecommunications no longer remain a mystery, that they no longer become costlier and costlier while elsewhere in the world their prices come down, and that the variety of services needed are not denied or postponed till the visionless organisation gets undermined by smuggled equipments and smuggled services.

A POLICY FRAMEWORK

What Government Policy should be :

PREAMBLE: Telecommunications are one of the most beneficent boons of Science and Technology for mankind. Since the 1950's there have been a series of revolutionary technological advances in electronics, communication satellites fibre optics, digital and integrated circuits. All these are leading to the convergence of computers and communications worldwide. Electronics-embedding, micro-computers (known as Personal Computers), telephone and other telecom terminals are growing very fast and their prices are falling, leading to their affordability by increasing number of people for varieties of purposes. Emerging from this is the electronification of information and its storage in computer memories. Telecommunications are becoming a means of transporting information which could be voice, telegraphy, telex, text, data, graphics and live video. As elsewhere in the world, in India too computers and telecommunications are being needed and used for a variety of purposes and unlike in the past, new needs, new demands and new uses and new services are being wanted for increasing the productivity of workers and machines, effectiveness and efficiency of administration and managements and for using information and knowledge as an important strategic resource. Without telecommunications and new information services, rapid and efficient economic development of industries, conduct of business and

management, not to talk of the participation of rural areas in economic and commercial activity of the country is painful and difficult. The worldwide technological developments together with the great increase in the talent and skills in technological, managerial, entrepreneurial, financial capabilities within India augur well for achieving world-class telecommunications facilities and services in our country also provided we have a policy, a clear vision for the next few decades and the will to take the necessary organisational, structural and industrial changes needed.

PRESENT REALITIES: The Government should be committed to a policy of a rapid realisation and extension of the benefits of telecommunications and information services from the traditional to the advanced forms to all segments of the population who are needing them. The present realities, however, are:

- Inadequate telephones.
- Unsatisfactory working.
- Inadequate production.
- Lack of production technology for several telecom systems and equipments.
- Uneven distribution of telephones with heavy and yet inadequate concentration in the urban centres and poor communications in the rural areas.
- Low productivity and a none-too happy personnel.
- Periodic rate rises.
- Insufficient Research and Development to ensure indigenous capability.
- Restrictive production policies and service inhibitive practices and attitudes.
- Not-so-customer-friendly, sensitive, and responsive organisation.
- No choice for customers.

- Inadequacy of investment funds.
- Organisational inability to evolve policies, take decisions, implement programmes, solve problems, develop resources (personnel, material and financial) monitor results to know the true status of service.
- Continuing gap between the range and quality of urban and rural services.
- Non-availability of strategic advantage-conferring new services (data, conferencing, FAX for example) and facilities (cellular and other radio transport for overcoming unreliable and difficult to quickly upgrade run-down cable systems as for example in Calcutta).

GOVERNMENT OBJECTIVES: Government should move fast to overcome all these inadequacies through a policy of:

- from monopoly to multiplicity of producers
- from budget to people for funds
- from bureaucracy to people — orientation
- from administration of rules to rendering of service
- from administered prices to cost-based charges to ensure —

(a) access to telephone on a community basis in the rural and urban areas by installation of public telephones by government and licensed parties. (b) rapid modernisation and growth to reasonably meet demands by the turn of the century. (c) indigenous design, development and production. (d) introduction of advanced information and communication services needed by the leading participants in our economic development. (e) improved customer satisfaction, choice and justice.

THE FOUR ASPECTS OF SERVICE : The Government should make a distinction between the various aspects involved in the planning, construction and delivery of telecommunications facilities and information services. These are :

(i) **Policy :** National policies for technology development, investments, network standards, volume and growth rate, regional and equitable development and international relations with other telecom networks and organisations will be decided in the Ministry/Commission in co-ordination with other Government Departments.

The Ministry and the Telecom Commission should not directly concern themselves with the operation and provisions of services by the field units.

(ii) **Production of Equipment :** (a) Government should permit production of all varieties of Telecommunication equipment by any Indian manufacturer, be they in Private, State Government, Central Government or Joint Sector. (b) Every piece of equipment should be thrown open to any competent Indian manufacturer. (c) Government should encourage and help technology transfer and availability from its own and help technology transfer and availability from its own and other's R&D effort to producers. (d) producers to ensure competition through which quality and right prices would emerge. There is no sense in importing from foreign, private suppliers all types of equipment while not permitting private Indian parties to produce. (e) Surveillance over production and supply of sensitive equipment will, of course, be the prerogative of the Government as every where in the world.

(iii) Service Provision: (a) In view of the tremendous transformation in the technology that is taking place and with the increasing availability of indigenously produced equipments, monopoly provision of all types of services is no longer either natural or economical, desirable or possible, especially with the growth of computers and their use by rapidly increasing number of customers not only in and for telephone terminals but for information services, distributed collection and processing of data and knowledge. (b) Traditional services, namely telephone, telegraph and telex could be provided on an exclusive basis as now. (c) All customer premises equipment including telephone wiring should be given by the DOT. (d) Newly emerging services (for computers, finance, banking, insurance, publishing, cellular and other radio services for mobiles, paging, conferencing, text-transmission, electronic mail, messaging, etc..) and value-added services should be on a non-exclusive basis by one or more licenced parties in addition to the traditional operator (DOT now and its new corporate entities in future). (e) The over-riding considerations for licenced provision of new facilities and services should be — Rapidity of introduction; — Innovativeness; — Least cost in establishment and service; — High productivity; — Technological contemporaneity; — Customer satisfaction and choice. (g) Intra-company multi-site dedicated networks for Government departments, State Governments, Government agencies and private and public companies should be allowed under licence with liberal lease of the network facilities like intercity circuits. (h) Some undertakings/organisations may be selectively allowed to establish their captive facilities in consultation and co-ordination with the public network owner/operator, the overall consideration being the

least cost and rapid and reliable availability, ease of maintenance and operation and user control for effectiveness.

(iv) **Regulation** : With the emergence of multiplicity of producers of equipments and services and a competitive environment, a regulatory body would be necessary to ensure fair application of national resources, including the most valuable radio spectrum and for enforcement of proper and equitable behaviour by the continuing monopolies in regard to customer grievances, prices and quality of service and promotion of customer choice. Some of its most important functions would be :

(a) Issue licences for introducing and operating certain services including allocation of radio frequency spectrum for various uses and users. (b) Relating prices of telecom services to quality and cost and also ensuring redressal of wrong-doing by the service provider. (c) Type approvals: Customer premises equipments produced by newer suppliers and purchased by customers would need to satisfy certain operating and performance standards for connection to the network. The regulatory body would obtain from and publicise the specifications and tests and arrange/facilitate certification of the customer provided equipments. This would ensure non-discriminatory behaviour by the established provider/owner of the network. Government holds that —

- policy, technology development and overall duration would be by Department/Commission.
- service provision will be by corporations, public and private as appropriate.
- regulation will be by a statutory body, and

(d) Manufacture would be governed by the industrial policy of the Government as a whole.

STRUCTURAL REFORMS: (a) In order to make the policy formulation and implementation as an effective activity, the Ministry/Telecommunications Commission should be freed from direct day-to-day responsibility for the provision of services. (b) The telecommunications in the country should be constituted into a number of State level or a group of State-level (in North-East and North-West India) operating companies, which will be subsidiaries of an All-India holding company which will own and also operate the inter-state telecommunications facilities and services. (c) So that the much needed investments from internal sources are forthcoming, special consideration should be sought for tax holidays for the new companies for a few years. (d) For rapid establishment of telecoms in the rural areas, one or more rural telecom corporations should be set-up with the missionary purpose of obtaining appropriate technologies and systems for rural applications and for construction of the rural network. (e) To mobilize financial resources from outside the established base of customers (through charges) a telecom Development Finance Corporation as a subsidiary of the All-India Telecom holding company should be set-up. (f) For further augmenting the financial resources Government should offer part of the equity of the proposed companies to Government financial institutions, private banks, insurance companies, Unit Trust of India, to employees and the public in a phased manner. These will be in addition to market borrowings as governed by the controller of capital issues. (g) The operating and holding companies should be professional, business-like

and talent-rich by having on the Boards of Directors persons of ability, variety of experience and proven success. (h) The more than century old Indian Telegraph Act should be replaced by a new Act with provisions to recognise the citizens' right to information and its exchange, to restructure and limit monopolies, to liberalise use of the telecom network, to facilitate provision of variety of information and other services and importantly to safeguard customers from exploitation by any corporation/authority.

R&D AND TECHNOLOGY : Adequate funds should be made available for research and development. Measures like a R&D cess on every telecom device produced and on the gross sales of telecommunications companies will be levied.

These financial resources and funds should be made available to recognised Research and Development Institutions which can be societies. All of these will be co-ordinated by the Ministry/Commission. A council for Development of Telecommunication Equipments should be established and it would consist of talents from different organisations. Indian manufacturing companies, Universities, Laboratory and societies for Research and Development will be adequately represented. They will all be recognised as national resources and will be utilised and funded to rapidly develop indigenous designs and technology and production.

C-DOT, TRC and others should be funded adequately and their programmes will be speeded up. We may even set up new R&D facilities in and around cities like Bangalore, Hyderabad, Pune and Calcutta for increasing simultaneous and regional development of talent and production facilities.

While we are on the way to indigenous capability in switching, we are deficient in design and production technology for transmission equipment besides components. We cannot suffer the penalty of lopsided growth with partial advances as in switching only.

We should speed up indigenous production capability and capacity, welcome participation in an assistance from any source with mutual benefit. Equity from NRIs and selected leading companies from abroad would be accepted.

Conservation of foreign exchange, continuing upgradation of any technology inducted into India and ability for adaptation and development of newer generations and types of equipment and systems of world-class would be the criteria for collaborative ventures.

New technologies in optical fibre communications, very small aperture terminals for use with communication satellites, cellular and digital radio should be introduced, if possible by self help and if necessary, by collaborative efforts for rapid roll-out of services. Not dogmas but practical and strategic advantages and need-fulfilment should determine each case.

Rural Telecommunications should receive special attention. Development of appropriate technologies and the rapid expansion of telecom services to all parts of the country should be facilitated by the establishment of special task — oriented Rural Telecommunications. They would be subsidiaries of the All-India Holding Company.

HUMAN RESOURCE DEVELOPMENT: Measures should be taken to increase the productivity of work force, improving their skills and advancing the skilled and the devoted.

The Regional Telecom Training Centres should be affiliated to local universities and talented telecom persons engaged in technology and engineering services would be enabled to obtain degree level qualifications for their advancement and for enabling them to handle the new technologies being introduced.

Personnel and Human resource development programmes should be launched to grade the skills and to cope up with the technological observance.

Persons should be helped to bring into being telephone service co-operatives or companies for taking over certain jobs, no longer required to be done or inefficiently done by the Telecoms or those works that could be done by other entities more economically and productively.

IMMEDIATE ALLEVIATORY MEASURES: Measures should be taken for immediate alleviation of difficulties and improvement of telecom facilities. Some are:

(a) Fascimile (FAX) machines will be installed in all the departmental telegraph offices. Telegrams in all Indian languages meant for circulation among these telegraph offices will be accepted. Telegrams originating and destined from and to over 500 such cities will be delivered within one hour anywhere in the country. (b) Telecom Bureaus will be allowed to render all telecom services to the public from their terminal devices. (c) Value added services and information services and data

communications will be allowed to be provided by competent enterprises. (d) Specifications for all types of equipments will be written, published and furnished to any seeker. To speed up type approvals, selected existing test houses will be authorised and new ones will be set-up. (e) All charges, rates and prices will be set in consultation with the Bureau of Industrial Costs and Prices. Customers and consumer bodies will be given opportunity to represent their view point. (f) The exemption arranged by Telephones from the application of Consumer Protection Act will be repealed. (g) Specific time commitments will be given for service provision, fault removal and leased circuit provision. Penalties will be imposed at increasing rates for defaults. (h) Service quality results will be published every month to enable consumers to check claims of improvement by providers. (i) Rebates in rentals will be given for service outages beyond 3 days for domestic telephone service, 1 day for leased national and international circuits. (j) Recurring licence/attachment fees for customer provided and type-approved attachments will be removed. (k) All long term deposits will be paid interest. (l) Customer representative bodies will be given recognition and rights to be consulted. (m) Plugs and sockets and private manual branch exchanges (PMBXs) will also be allowed to be made by non-DOT/non-Government enterprises, customers may buy and use such type approved devices. (n) The Mahanagar Telephone Nigam Limited (MTNL) and Videsh Sanchar Nigam (VSNL) will be shaped to act vigorously, commercially and efficiently, unhindered and unfrustrated by interferences from administrative bureaucracies. So would all the new companies to be set-up. All will act for equipment and material source development and procurement. (o) The VSNL's and TCIL's potential for foreign exchange earning and foreign

ventures in international services markets will be fully facilitated and fostered.

In conclusion, we should make a new beginning to really make the customer king, to give him more choice more and affordable services with a new technology befitting this great country. All the policy changes including the enactment of a new Telecom Act and new operating companies should be effected from 1990-91, to be completed by 1991-92.

The views expressed in this booklet are not necessarily those of the Forum of Free Enterprise.

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The Forum of Free Enterprise is a non-political and non-partisan organisation, started in 1956, to educate public opinion in India on free enterprise and its close relationship with the democratic way of life. The Forum seeks to stimulate public thinking on vital economic problems of the day through booklets and leaflets, meetings, essay competitions, and other means as befit a democratic society.

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Published by M. R. PAI for the Forum of Free Enterprise,
235, Dr. Dadabhai Naoroji Road, Bombay 400 001, and
Printed by S. V. Limaye at India Printing Works,
9, Maharashtra Chamber of Commerce Lane,
Fort, Bombay-400 023.