

Development Discussion Papers

Information Technology-Led Growth Policies: A Case Study of Tamil Nadu

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Development Discussion Paper No. 729
October 1999

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**INFORMATION TECHNOLOGY-LED GROWTH POLICIES:
A CASE STUDY OF TAMIL NADU**

Nirupam Bajpai and Anupama Dokeniya

Abstract

The Tamil Nadu government has expressed an intent and developed a policy framework to accord primacy to an informatics-led growth strategy in accordance with global trends in this area. The policy covers various aspects of information-led growth – creating a robust domestic IT industry- ranging from the application of information technology to various aspects of life, to the growth of services, and increasingly, the development of a robust information infrastructure backbone on which information goods and services will ride. This paper discusses the information technology policy of the Tamil Nadu government assessing these various aspects, and the potential linkages between them.

There are some crucial inputs into an information infrastructure initiative: (1) research and training institutions; (2) a local labor market with quality engineers and technicians; (3) favorable tax and credit incentives; (4) bureaucratic flexibility and efficiency, institutional support; and (5) supporting infrastructure: a good transportation system, adequate telecommunications.

On the demand side are the applications that need to be encouraged for efficiency gains; for diffusing the benefits of the information revolution through increased citizen participation; and for creating demand as a spur to the information technology industry itself. The impact of a robust IT industry on development of the regional/local economy as a whole will depend on various factors: increased employment-generation; efficiency gains from the application of information technology; and foreign capital inflow, resulting both from the foreign investment in the local IT industry and export earnings gained by progressively capturing higher value-added segments of the global IT market.

The paper argues that the extent to which the benefits of the ‘information revolution’ are actualized and the potential of IT is harnessed will depend on the success with which countries (and regional sub-divisions) are able to understand and incorporate into policy and initiatives these inter-linkages between various components of an IT strategy, as well as the specific impact of IT on economic growth and development. The Tamil Nadu government’s IT strategy, although progressive and comprehensive, is deficient in its understanding of these inter-linkages, and needs to address them to ensure that a flourishing IT industry translates into regional development.

JEL Codes: L86, O38

Keywords: Information Technology, Growth Strategy, and Tamil Nadu.

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INFORMATION TECHNOLOGY-LED GROWTH POLICIES: A CASE STUDY OF TAMIL NADU

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Pronouncements by most states in India of an ‘information society policy’, are responses to a growing global discourse on the primacy of an ‘information infrastructure’ to all future economic activity and growth strategies. Information society policies cover a variety of phenomena - ranging from the application of information technology to various aspects of life, to the growth of services, and increasingly, the development of a robust information infrastructure backbone on which information goods and services will ride. The phrase ‘information infrastructure’ particularly, assumes the significance of the convergence of information and communication technologies, and draws attention to the importance of creating an adequate telecom backbone capacity to enable the establishment of an information economy. Tamil Nadu’s efforts in this direction have been slightly more modest, given its status as a regional state, with limited jurisdiction over telecom infrastructure issues.

Nevertheless, its 1997 Information Technology (as opposed to information infrastructure) Policy (see Appendix 2) encompasses the various facets of establishing an information society. It states that the main objectives of the policy are:

- To encourage and accelerate the growth of hardware and software industries and associated services in the State and to remove the bottlenecks for starting and running of such units in Tamil Nadu.
- To increase both domestic and export earnings of software and hardware sectors in the state.
- To upgrade and develop manpower skills required for the I.T. industry by facilitating training, to accelerate the use of I.T. in schools, colleges and educational institutions with a view of providing skills and knowledge to the youth to make them fit for employment in this sector.
- To upgrade the quality of life the citizens of the state by facilitating access to consumer application of information technology.
- The Government will also encourage use of I.T. in Government institutions and Departments with a view to improving productivity and efficiency of Government services, revenues and tax collections, and assist in the process of decision-making by Government, and monitoring of Government programs¹.

These aspects are not necessarily related in that the presence of an information technology industry might not assure IT-led growth for the entire economy. This will be based more importantly on the success with which IT is applied for economic growth and productivity

¹ Government of Tamil Nadu, Information Technology Policy, 1997

What is markedly absent from these objectives is the emphasis on a communications infrastructure, which we have discussed as one of the important aspects of an information society. This is indicative of the limited role of the state government in the IT sector, as will be discussed below.

generally². The application of information and communications technology to the government and industry is a demand-side issue, while establishing a local information technology industry, through both domestic and international investment as well as the provision of a telecommunications infrastructure are essentially supply-side issues. Both conceptually, and in practical terms of policy-making and government initiatives, these aspects need to be distinguished, and the inter-linkages between them need to be explored. This paper will discuss the information technology policy of the Tamil Nadu government assessing these various aspects, and the potential linkages between them. Most of the discussion is based on field research conducted in Chennai in May 1999, comprising of extensive interviews with both government and industry officials (see Appendix 1). This is supplemented with data from official publications and information posted on the Internet (see Appendix 3 for list of web-sites on TN economy).

The paper will focus specifically on strategies of developing a local information technology industry. One of the main pillars of informatization has been the emphasis on attracting global IT hardware and software firms to locate to the local area as a spur to the entire local/regional economy. While this constitutes part of the information society discourse, high technology-led growth strategies certainly pre-date the contemporary emphasis on information infrastructure and have been an important part of growth strategies, especially in the East Asian newly-industrializing countries (Evans, 1995; Carnoy et al, 1993; Castells, 1989; Castells and Hall, 1994). Regional development theorists have pointed to the significance of high-technology zones as contributing to general economic welfare, through the diffusion of economic benefits. To institute high technology-led growth, regional states have to gain competitive advantage to both attract private investment, and make their industries more competitive. The location of these specialized areas are seen as having potential for regional development through spin-off effects in the areas of employment - especially highly-skilled, and hence highly-paid - employment, capital inflow, diffusion of technological know-how etc. Such zones are seen as having the potential to capture the high value-added segments of the global market, if the availability of highly-skilled (and low cost) labor, and technological facilities, enable situating advanced services in these zones.

However, this paper argues that the extent to which these benefits are actualized and the potential of IT is harnessed will depend on the success with which countries (and regional sub-divisions) are able to understand and incorporate into policy and initiatives these inter-linkages. As a framework for reference, Figure 1 shows the linkages between the various aspects of an IT policy. The input box identifies the crucial inputs without which an information infrastructure (II) policy is unlikely to be successful.

There are some crucial inputs into an information infrastructure initiative:

- research and training institutions; a local labor market with quality engineers and technicians.
- favorable tax and credit incentives.
- bureaucratic flexibility and efficiency, institutional support.
- supporting infrastructure: a good transportation system; adequate telecommunications.

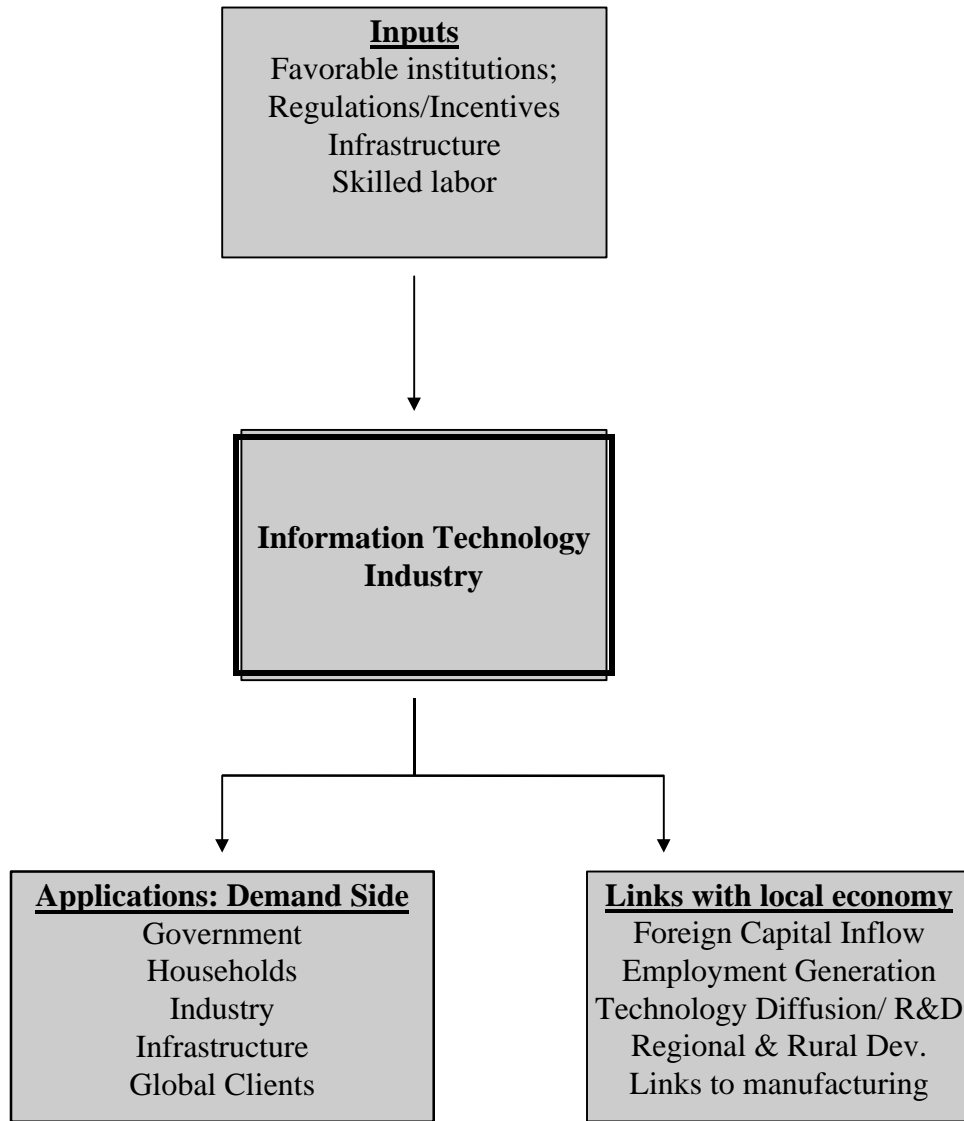
² This point was made markedly by Gopal Srinivasan, CEO of TVS Electronics in an interview. He pointed out that while Bangalore had a developed a flourishing information technology industry, Karnataka state is relatively poor in the diffusion and application of information technology.

Low cost, skilled labor is undoubtedly crucial and India's comparative advantage in software has been premised on a well-developed educational infrastructure. However, in a situation where countries are becoming increasingly competitive in attracting international investment, the existence of a favorable institutional climate -- comprising of, among other things, investor-friendly government institutions, market-friendly incentives, a rationalized tax structure, subsidies where necessary, and clear non-restrictive regulations - that invokes investor confidence is instrumental to an outward-looking strategy. The third crucial input is the availability of necessary infrastructure - in the case of information technology, this of course being a telecommunications infrastructure. The importance for upgrading the latter has become increasingly more pressing as the shift to information based goods and services requires increased bandwidth.

The applications side refers to the users of the information products and services. In order to reap the advantages of informatization, the applications need to be encouraged for efficiency gains; for diffusing the benefits of the information revolution through increased citizen participation; and for creating demand as a spur to the information technology industry itself. Concerted efforts to create demand through applications in government, infrastructure sectors, households and domestic industry need to be made. The last box shows the potential ways in which the development of an information technology industry results in development of the regional/local economy as a whole: through increased employment-generation; through efficiency gains from the application of information technology; and through foreign capital inflow, resulting both from the foreign investment in the local IT industry and through export earnings gained by progressively capturing higher value-added segments of the global IT market.

The following sections will deal with each of these aspects. Section 1 discusses the essential inputs into a successful IT strategy, analyzing both the strengths and weaknesses of Tamil Nadu along the dimensions mentioned. Section 2 discusses the linkages of an IT strategy to general economic development, and applications of IT for development.

Figure 1: IT and the Regional Economy



SECTION 1: CRUCIAL INPUTS INTO IT STRATEGY

1.1 Institutional Environment

The state government policy on IT points to the importance of the IT sector for the economic development of the state. Re-iterating the thrust on IT in the state's growth strategies, the Governor, Fatimah Beevi announced in her address to the state Assembly that the government "has decided to accord high priority for Information Technology due to its potential for accelerating the economic growth of the state, providing increased employment opportunities, and enhancing the efficiency of government agencies and the quality of their service to the people³."

Government documents point out that the emphasis in the years to come will be in:

- create infrastructure for software development at Chennai, Coimbatore, Madurai and Trichy.
- encourage TN companies to globalize their operations to meet the demands of economy.
- encourage global companies to relocate their operations in TN and to start their new manufacturing divisions in TN.
- encourage joint venture initiatives in leading edge technologies.
- reversal of brain drain.

Undoubtedly, the first step in a successful IT strategy is the creation of an institutional infrastructure that supports the establishment of an IT industry. In the more industrialized countries, technology parks have arisen spontaneously with the convergence of a number of factors. The newly-industrializing countries (NICs), South Korea, Singapore, Hong Kong⁴ and Taiwan, along with their economically stronger neighbor, Japan, are often presented as successful developmental states, and examples for the less industrialized countries (Amsden, 1989; Deyo, 1987; Evans, 1995). Their success is often attributed to a proactive developmental state, willing and able to increase the competitiveness of indigenous companies in the world economy by providing necessary support in the form of industrial and communications infrastructure, labor training, credit, trade policies, and science and technology.

In Japan, for instance, the Ministry of International Trade and Industry (MIIT) undertook the mandate to chart a long-term technological development future, to jump start it by public investment in basic research and development, and to promote and coordinate the resulting commercial exploitation through vigorous competition within the private sector. Korea's Ministry of Science and Technology is following the same model (Evans, 1995; Castells and Hall, 1994).

The TN government has taken steps in this direction by establishing a Department of Information Technology, which was separated from the Ministry of Industry in 1997, into a separate department. The bureaucrats, in charge are very pro-active, and industry-friendly. It has

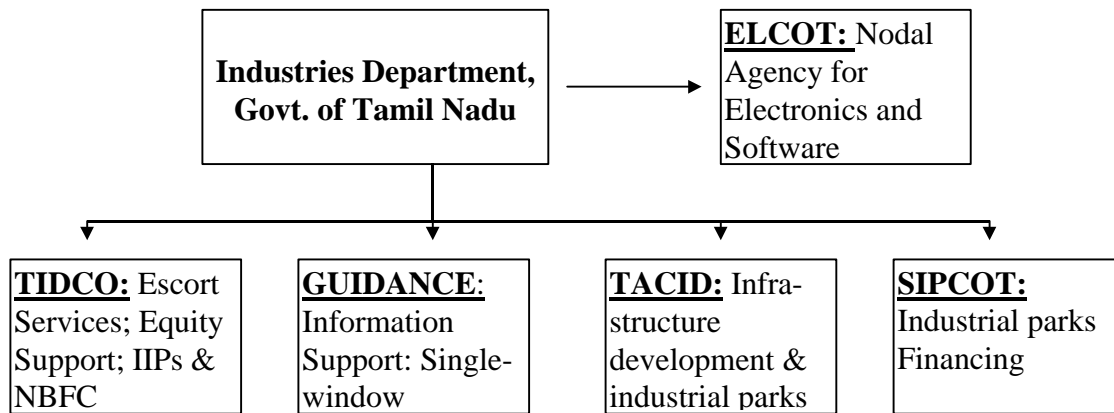
³ Speech of the Governor, Fatimah Beevi

⁴ although other East Asian countries, notably Malasiya, can rightfully make claim to this label too.

also set up an Information Technology Task Force, with members from both the government and private industry.

Tamil Nadu has also established a set of very progressive and forward-looking institutions - ELCOT (Electronics Corporation of Tamil Nadu); GUIDANCE (Tamil Nadu Industrial Guidance & Export Promotion Bureau) ; TACID (Tamil Nadu Corporation for Industrial Infrastructure Development Limited), SIPCOT (State Industries Promotion Corporation of Tamil Nadu Limited), SIDCO, TIDCO (Tamil Nadu Industrial Development Corporation Ltd) -- all of which provide institutional and infrastructure support to various industries that the state government seeks to invite or foster in the state.

Figure 2: Institutional Environment



The state government has provided a variety of incentives to the IT industry to locate in the state:

- no entry or purchase tax in Tamil Nadu
- uninterrupted power facility
- IT parks eligible for incentives and concessions on par with other industries.
- Private IT park developers to be assisted with land acquisition and re-zoning.
- co-ordination with VSNL/DOT to provide and expand dedicated connectivity/Earth station.
- private IT parks will have the same status as IT parks developed by government agencies subject to certain quality standards and location for eligibility for concessions and incentives.
- Incentives to units in the ITP/STPs will be extended to stand-alone units outside the park also.
- All software industries including services and training institutions will be entitled to all concessions and incentives applicable to industries.
- exemption from stamp duty and registration charges at the time of allotment of sites/built up space, and exemption of works contracts tax.
- single window clearance for units within the parks.
- Software units will be excluded from purview of TN Pollution Control Act.

One of the main problems has been the diffusion of IT awareness to different levels of the bureaucracy, which makes streamlining bureaucratic procedures particularly difficult. While the top bureaucracy in the state has been very dynamic in pursuit of an industry-friendly environment and in its efforts to launch an information society in the state, such dynamism is slow to diffuse to other levels of the administration⁵, and to other sectors, not directly concerned with IT. The NICs have created clusters of institutions to improve the ability of small and medium-size enterprises to absorb and implement the new technologies. Such projects have allowed some east Asian cities to become 'information nodes', providing connection and networking for cities throughout the region, and leading to rapid economic development.

The emphasis on infrastructure development in the IT parks has the potential to result in inadequate emphasis on creating an institutional environment that is favorable to the IT industry as a whole rather than the ones that are located in these parks. In theory, the government does state its intention to provide incentives to all IT firms: "Apart from development of software and hardware Industry through ITPs / STPs the Government will also encourage software development outside the Parks by giving such stand-alone units the same incentives as the Units in the ITPs / STPs. There will be no location restrictions for setting up units exclusively engaged in software development/ training."⁶ However, one of the major deficiencies of the IT policy that emerged from interviews with software company officials was that, companies that locate outside the technology parks would still have to approach the various agencies separately to get the necessary clearances. Single-window clearance doesn't necessarily operationalize in practice and still involves running to different agencies to get access to different facilities - for instance, getting land allotted to set up a company, when it is not located in the software park.

1.2 Infrastructure

Both social and cultural infrastructure is important for the development of a robust IT industry, both to enable firms to achieve operational efficiencies, and to attract a high-quality human resource base, an indispensable input into the IT industry. Physical infrastructure includes telecommunications, good roads and transport, and power supply. The social-cultural infrastructure would include a good educational system, a cosmopolitan entertainment facilities etc. While Tamil Nadu does have a good educational system, it is markedly deficient in creating a cosmopolitan environment that would attract global professionals.

A recent NASSCOMM study rated Tamil Nadu the best location for setting up a software industry. On a scale of 0-3.5, it rated TN very high among a set of indicators, as the following table shows.

⁵ Interviews with top government officials in the Industry and IT departments, ELCOT, TIDCO, TACID and GUIDANCE.

⁶ Government of Tamil Nadu, Information Technology Policy, 1997

Table 1: Ranking of TN as Location for Software Industry

Infrastructures & Amenities	Nasscom Ranking	BT-Gallup Rank in India
Availability of Software Manpower	3.5	NA
Data-communications Facility	3.0	NA
Power Supply	2.8	Third
Education Facility	3.0	NA
Airports	3.4	Second
Transportation	3.0	Second
Cost of Living	2.8	NA
Cost of setting up of Software Unit	2.95	NA
Quality of Life/Social Infrastructure	3.0	Second
Climate	2.5	NA
Proximity to Market	3.3	Third
Overall Rating of City	3.2	NA

Sources: NASSCOMM Study; Ministry of Industry Presentation

The TN government has instituted a relatively ambitious projects for the development of the IT sector. Four major IT park initiatives are in the works, equipped with state-of-the-art infrastructure, provided by the government.

Table 2: Main IT Park Infrastructure Development Projects

Name of IT Park	Implementing Agency	Total Investment	Current Status of Development	Main Facilities
Siruseri IT Park (near Chennai)	SIPCOT	NA	NA	200 acres
TIDEL software park, Taramani (in Chennai)	TIDCO-ELCOT	NA	NA	8 acres
Texcity – Technology Park at Coimbatore	Private Initiative, ELCOT	NA	At initial stages	10,000 sq. meters
Sholinganallur Software Technology Park	ELCOT		Being set-up; Facing legal problems in land acquisition	NA

Sources: Various government documents.

While the NASSCOMM study rates TN quite high in terms of physical infrastructure, many problems remain in this area.

Power Supply

While the government has promised uninterrupted power supply to the IT industry, power-supply continues to be a major problem faced by software firms⁷. According to the 1998 Global Competitiveness Report, the quality of infrastructure in India is judged to be very poor. This was true in all areas: roads, ports, power, and telecomm. India was ranked 53rd out of 53 countries in overall infrastructure. While Tamil Nadu rates better than other Indian states, the state is required to upgrade the quality of its existing infrastructure and add to the existing capacity in order to attain and sustain higher levels of SDP growth.

In the area of power, for example, the reform of the state electricity board (SEB) is critical if uninterrupted power supply is to be assured to investors. This would imply rationalization of the tariff structure, (the present structure of tariffs in electricity, involving extensive cross subsidization for agriculture, has imposed disproportionate burden on paying customers. This has led to decline in consumption of power by high-tension users, with serious financial consequences for the SEBs), reduction in the transmission and distribution (T&D) losses, and reform in the generation and distribution of power.

There are severe organizational deficiencies in SEBs. Some of these are: absence of a well thought human resource development policy; lack of incentives for performance; poor or no review of functions; lack of inventory control and cost management, and absence of MIS - use of outdated information for decision making.

The context in which SEBs function is wholly dysfunctional for high performance, and results are affected a number of factors, such as extreme politicization in staff matters; interference in contracts and purchases; influencing the drawing of new lines, location of substations, and superceding the judgements of technocrats.

Plant load factors (PLFs) have been historically low – worse in the SEB generators than in those of the National Thermal Power Corporation (NTPC) – and T&D losses largely due to pilferage are very high. Increasing efficiency in these two areas can itself lead to a vast improvement over the present situation. Of course, given the impact of the SEB losses on the state budgets year after year and the worsening state of State finances, reform of the tariff regime and privatization of the generation and distribution networks cannot be postponed for long.

⁷ Officials of the local IT industry have formed an association to represent these problems to the government, and to make a concerted and coordinated effort to find solutions to these problems.

Transport

Many industry officials complained that it was difficult to get access to facilities located on the outskirts of the city, and employees were loath to commute to these locations in the absence of good transport facilities. Reform in the area of urban transport is crucial if the State government is to achieve success in attracting companies to locate in Tamil Nadu. Since firms look to the outskirts of major cities, such as Chennai to set-up their offices, the availability of efficient transportation is necessary. Commuting in the buses of the state-run State Transport Corporation is difficult, even though cheap since these are subsidized heavily. Bus tariffs should be rationalized so as to cover the costs of running these bus lines and improving their services. Of course, private bus operators can be introduced in specific routes to cater to the demands of the firms locating in the suburban areas. In the next few years, as in the case of the power sector, in the urban transport sector too the State government has to privatize these infrastructure services so as to keep up with the rising demands of a fast growing state economy.

Telecommunications

The availability of a robust telecommunications infrastructure is crucial in investor decisions to channel capital into a particular region. As the National Taskforce on Information Technology, points out: “International experience has shown that hi-tech industries flourish essentially in the rural hinterland adjacent to cities with modern telecom and communication infrastructure and top class hi-tech educational/research institutions.” Undoubtedly the biggest stumbling block in the development of a successful information infrastructure policy is the limitation of the telecommunications backbone and the inability of the state government to take very many initiatives in this area given that the Central government has jurisdiction over this.

The problems of a telecom infrastructure have affected different sectors of the state: the software sector for instance, needs high bandwidth dedicated lines, with constant customer support. VSNL, the international telecom monopoly, provides 24 hours a day, seven days a week customer service support. The problem arises at the level of the local lead line - software companies complain that often the local loop goes down resulting in the inability to uplink data streams. This has been one of the major problems faced by the local software companies. The TN government has already taken significant measures in this direction, the WorldTel project being the primary among them.

The ‘97 IT policy states the government’s intention to address this problem: “The Government will provide assistance to VSNL and Department of Telecommunications to expand communication links in the State and also provide the land and power wherever required by such agencies. State Government will liaise with Government of India to ensure dedicated VSNL connectivity / Earth Stations as well as Electronic Telecom facility for each ITP”⁸. However, the Tamil Nadu circle has been disadvantaged by the absence of the autonomous status that the MTNL has enjoyed in Mumbai and Delhi. Till the policy is changed at the Central level, the state

⁸ Government of Tamil Nadu, Information Technology Policy, 1997

government's ability to develop the sector is restricted to make representations/ lobby at the Central level.

Political considerations are very important in determining the success of these lobbying efforts. The TN government's efforts have been restricted by the absence of a stake in the central government. The delays in the implementation of the National Telecom Policy at the Center, made representations of the state government to upgrade the telecom service unsuccessful. Moreover, there is no coordination mechanism between the state government and the DOT at the state levels. The state government officials, for instance, voiced concern over the lack of information about the expansion plans of the state level DOT.

1.3 Technical Education

Training the labor force in the use/application of information technology has the possibility of giving the state cost and competitive advantage for the location of other industries. While many states in India are initiating information infrastructure policies, what makes Tamil Nadu's efforts in this direction more credible - and attractive to potential investors - is the large pool of highly-skilled labor that provides a ready input into the IT sector.

The 1997 IT policy has provided for the diffusion of IT know-how throughout the state. It states: "Basic training in computers will be introduced in all schools from the high school level. The endeavor will be to cover all schools within a 5-year period. Training of teachers will also be done in a phased manner over the 5-year period. In addition to Government sponsored training programs, State Government will facilitate and co-ordinate with other sponsors like INTEL, IBM, APPLE, etc., for training of teachers."⁹

The Tamil Nadu government has also taken strong initiatives to develop the technical educational base in the state. The most recent initiative in this area has been the setting up of the Tamil Nadu Institute for Information Technology (TANITEC). Tanitec has drawn up a three-pronged strategy to make Tamil Nadu an 'intelligent state' where information technology will be utilized in all aspects of life. The strategy comprises education; research and development; and upgrading of infrastructure of educational institutions by networking the whole state by VSAT. Tanitec is proposed to have strong linkages with industry in the form of participation of industry executives in the faculty of the institute and participation of students in industry.

⁹ Government of Tamil Nadu, Information Technology Policy, 1997

SECTION 2: LINKAGES TO GENERAL ECONOMIC DEVELOPMENT

The information technology revolution is touted as leading to many benefits and possibilities for economic growth. One of the main aspects of this correlation that has been studied is the impact of ‘informatization’ on economic performance. Typically, this refers to the benefits accruing as a result of deployment of information technology in various manufacturing, managerial, coordination activities, and the provision of services. It is important to make the distinction between the deployment of information technology - computerization - on economic performance and the impact of the location of an IT industry economic development. As discussed with reference to Figure 1, the relationship of IT to economic development takes into account, some key aspects.

- Foreign capital inflow
- impact on employment
- Technological diffusion and local R&D, enabling capturing a higher value-added segment of the global market.
- Regional and rural development
- links to manufacturing.
- Applications

2.1 Foreign Capital Inflow:

The software industry in Tamil Nadu has been performing extremely well, growing at a rate higher than its competing neighbors, Andhra Pradesh and Karnataka. According to STPI, software exports from the state have grown from Rs. 400 crores in ‘97-’98 to Rs. 1246 crores in ‘98-’99¹⁰. The number of software companies has grown from 108 to 153. Offshore software development has grown to Rs. 896 crores from about Rs. 200 crores. 76% of the software exports are to the US. About 37 companies have exported software worth more than Rs. 1 crore each. The software export turnover from Tamil Nadu has increased from Rs. 2.35 crores in 1993-94 to Rs. 12.46.14 in 1998-99. Of this, STPI units accounted for Rs. 776.14 crores, and non-STPI units accounted for Rs. 470 crores. In 1998-99, total offshore export earnings amounted to Rs. 896.14 crores, while on-site amounted to Rs. 350 crores. The projected revenue for Tamil Nadu according to the Ninth Five-year Plan for 2001-2002 is 13,000 crores (Rs. 5000 crores in hardware and Rs. 8000 crores in software).

2.2 Employment

While critics argue that new information technologies are more likely to lead to job loss because of laborsaving automation, and rationalization of economic activities, computers have employment-creating potential. Moreover, the employment that it creates is of a more highly skilled variety, implying that more highly paid labor force that would entitle them to a better quality of life. Of course, this comes back to the question of investing in education. The

¹⁰ Crore =10 Million

employment benefits of the IT industry in Chennai would be significant since Tamil Nadu has a very strong technical education base.

Moreover, the information age would likely radically alter the structure of the work force essentially disrupting traditional divisions of labor, and creating new ones. It seems likely to create two-tiered workforces - upper level of knowledge workers, analysts, and a lower level of typists, data processors, and enablers. The resulting division promises to flatten previous work hierarchies and create new management challenges. Aside from simple computer literacy, those developed country cities with high numbers of critical thinkers capable of turning raw data into marketable information will thrive. Since lower-skilled labor is more susceptible to automation, one of the biggest challenges of informatization, is to re-train workers in new skills. In the NICs, governments have proved crucial in coordinating investments and programs in telecommunications, education and training, and in diffusing information services and software applications.

2.3 R&D, Entrepreneurship, and the Innovative Milieu

In their pursuit of technology-led growth, countries have adopted a variety of strategies (Castells and Hall, 1994; Dubard, 1995, Zeigler, 1995):

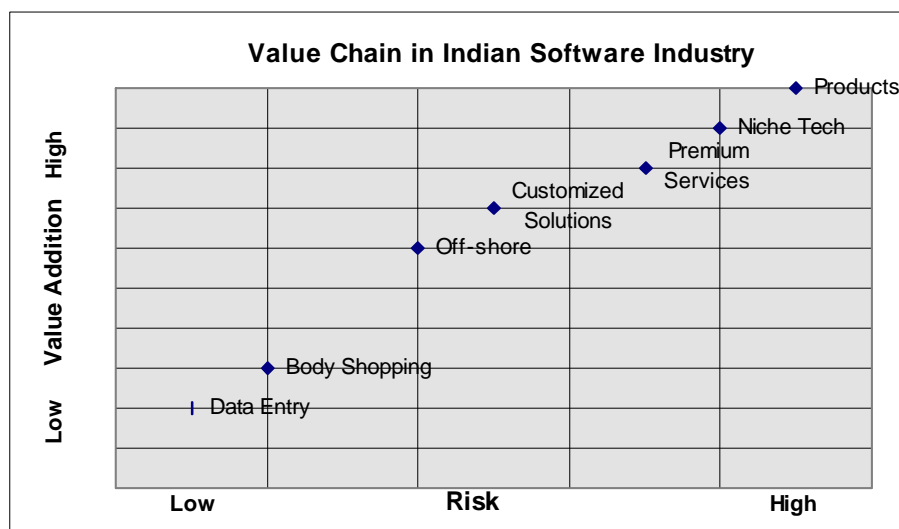
- Industrial complexes of high technology firms that are based on an innovative milieu, linking R&D and manufacturing
- Science-cities, which are essentially scientific research complexes.
- Technopoles that aim to induce new industrial growth, in terms of jobs and production, by attracting high-technology manufacturing firms to a privileged space - these are mainly defined in terms of economic development. This is a deliberately established high-technology business area, resulting from government or university-related initiatives.
- Teleports: To maintain and support information-based industries, larger cities in more developed nations have created teleports, concentrating information technology resources such as communications equipment linked to satellites. Users either locate adjacent to the teleport, or access it through communication lines. Teleports exist in London, Rotterdam, New York City, and Osaka and are often joint ventures between public and private concerns. Germany has a national chain of some 30 teleports, and the concept is spreading across Europe.
- Specialized Telecommunications Networks: Edinburgh, Scotland, and San Antonio, Texas, have each separately worked with local telecommunications companies to develop specific packages to attract businesses.
- Targeted Development: Singapore is the most prominent example. This city-state seized upon its strategic location to develop as an information transportation hub and used technology to spring its economy. Some 3,000 companies have been attracted to Singapore, which has been

so successful that it now directs some low-skill jobs away from its workers and toward other area countries. Still, Singapore has attributes that make such success difficult to transfer—primarily an extremely strong central government with the ability to if the user' doesn't need the information on his or her computer.

Castells and Hall point out that economic theory suggests that early-developing countries will need to concentrate on importing existing technologies. At the next level of development, they would need to encourage inward investment via transnational corporations. Since they compete with other countries for this pool of investment, they need to provide incentives (as discussed above to international capital). At a higher developmental level, they would aim to develop sufficient technological capacity to improve on existing technology, by a combination of downstream product innovation and process innovation. In terms of the national economy, the advanced technology industries can be exported from leading to lagging regions, while the leading regions -- and therefore the economy as a whole - are moving into the field of indigenous innovative capacity.

As Langdale (1997) points out, Northeast Asian economies (Japan, South Korea and Taiwan) with large export-oriented information equipment industries are rapidly developing broadband and multimedia industries because it would be very difficult for their firms to be internationally competitive without having an innovative domestic market. A second group are regionally oriented economies (Singapore and Hong Kong) that have focused on their regional headquarters' role for major foreign (mainly US) multimedia companies. The third group ranges from the near newly industrializing countries (NIEs), such as Thailand and Malaysia, to poorer countries such as China. In general, the tele-density in these countries is very low, and most of these countries are primarily concerned with expanding basic telephony services, particularly in rural areas.

Figure 3: Value-added Chain in Indian Software Industry



Source, Bajpai & Shastri, 1998

A robust IT industry might be created by attracting foreign investment to take advantage of low-cost technically-competent labor, for various low-end activities such as data-processing, data-entry etc. Eventually in order to make the benefits from high technology growth sustainable, emphasis will have to be placed on well-educated labor and applied research in specific fields. Investing in and encouraging basic research is crucial. In the long run, innovation will come through investment in and promotion of innovation centers, and enable the country (or region) to progressively harness a higher value-added segment of the world market.

The establishment of a research university would be important at this stage. Developing centers of excellence for both basic and applied research is thus key to technology-driven growth. Investing in R&D, with the strategy of promoting later innovations has to be an ongoing activity. Just as Stanford University was key to the development of Silicon Valley and MIT was key to the development of the Boston Corridor, significant synergies with university research has to be inculcated. Chennai, of course, has a natural advantage in the location of the Indian Institute of Technology.

In Taiwan, the government set up the Hsinchu Park that was based on a deliberate cooperation between the government, university and the industry. A major reason for the development of the technology park in Hsinchu was the presence here of the Industrial Technology Research Institute (ITRI), a major technology transfer institution. One of ITRI's six research organizations, the Electronics Research and Service Organization (ERSO), was used deliberately by the government to diffuse microelectronic technology among Taiwanese firms, by organizing seminars and training programs where Eros's technology was communicated to private firms. To ensure linkages between ERSO and private firms, the Government funds only 50% of the Institute's budget. The other half comes from service contracts and technology sales to firms. Firms located in the Hsinchu park also enjoy a five-year tax holiday, a maximum income tax rate of 22%, duty-free imports of machinery, equipment, raw material and semi-finished products, and capitalization of investors' patents and know-how as equity shares, tax breaks and low interest loans.

The other important components in making the advantages of IT-led growth sustainable are to inculcate the development of a local entrepreneurial base. A local entrepreneurial base would not only decrease dependence on foreign sources of investment, but also result in an innovative milieu that would enable the local industry to situate itself at a higher value-added segment of the market. Tamil Nadu does have the genesis of a strong local entrepreneurial base with companies such as Pentafour, Future Software, Polaris Software, which are home-grown companies that have expanded globally, in addition to more established firms such as TCS and HP.

2.4 Regional and Rural Development

The danger of high technology-led growth is that it might result in over-emphasis on certain – usually urban areas and regions – to the absence of a more balanced, and equitable regional development. The weak link in the Hsinchu Park has been its failure to make linkages between the Technology Park and the surrounding areas. As Castells and Hall (1994) point out,

the town of Hsinchu continues to be more of a satellite town of Taipei. The IT parks in TN are similarly satellite towns of Chennai. Culturally, administratively, they are likely to continue to be linked with Chennai, where most of the educated labor force would want to be located, as well as where most companies would want to locate their operations.

Madon points out that contrary to the international reputation earned by Bangalore, the advent of the information age has not affected the overall economic picture of the state, which remains primarily an agricultural state. Out of the total population of almost 50 million people, around 76% live in rural areas, and there is a high incidence of rural poverty in these areas. Foreign high-technology companies are largely responsible for the rampant wage inflation in Bangalore.

Japan's technophiles program was intended to reduce geographical imbalance, and bring about regional development. It viewed the 'technophiles' as a technology-intensive city that effectively combines an industrial sector composed of electronics, machinery and other most advanced technologies with an academic and other advanced technologies with an academic and a residential sector. The program was intended to also develop a local R&D capacity to help trigger the development of such industries locally, and the relocation of high-technology industry from the congested metropolitan areas to the hinterland -- the more backward regions.

MITI intended to create incentive for local initiatives - the technology parks would be located in regions where the local government provided the most attractive conditions. hence, the local government was intended to play a crucial role in attracting the prefectures. MITI's technophiles program has had only moderate success. The strategy of developing R&D through diffusion to the local areas has not been successful, in that most of the firms located in the regional prefectures ended up being branch plants. This demonstrates essentially a tension between the two objectives of situating industries in geographically backward areas, and establishing an innovative R&D base.

2.5 Applications

While the high technology sector might itself make a small contribution to total output, and on its own has limited impact on productivity and competitiveness and standards of living, its real impact stems from the capacity to deploy technical capabilities across all economic and industrial activities. An OECD discussion (OECD, 1989; OECD, 1992) of IT and economic growth suggests that future growth areas triggered by broader IT production and use will be nurtured from:

- Intermediate and final demand of industry: Since, IT-induced change will proceed by the use of IT products in other industries. The engineering industry - covering mechanical, electrical, and electronic and instrument engineering, transport equipment and miscellaneous mechanical goods and precision instruments - will be a major recipient of compensation effects that arise in capital goods production as the new technology is used more extensively. The state has to make concerted efforts to encourage the adoption of IT in industry, both to

increase operational efficiency of local businesses, and to create an indigenous market for IT products.

- **Government purchases:** The deployment of information and communications services for increasing efficiency in governance – what has become known by the buzzword "e-governance" – (a) to increase the interface between the public and government; (b) for service delivery (c) to increase efficiency in governance etc. The deployment of IT in governance has been the most difficult part of the IT initiatives. Many impediments arise in the deployment of IT in governance. The introduction of IT is disempowering to mid-level officials. Secondly, one of the most important problems in the implementation of IT in government, is what the IT secretary, D. Prakash, refers to as 'ownership' of the IT solution¹¹. By this he means that the impetus to implement the IT infrastructure, to identify the problems that require an IT solution, to sustain the implementation etc. should come from within the concerned department itself. In the absence of this, there is likely to be considerable resistance to the implementation of the IT. The outside agency that implements the IT solution will not be able to do it in the absence of impetus internally. The outside agency would provide technical expertise.
- **Private household demand:** This will be difficult till efforts are made to raise the economic development level and standards of living in general. (Statistics on diffusion of computers in Tamil Nadu, and comparison with all-India figures).
- **Infrastructure investment:** This is a problem if IT is regarded as separate from the rest of the industry. For instance, many of the interviewees, who are top officials of other infrastructure sectors, demonstrated an absence of involvement with the IT sector.

2.6: Hardware and Equipment Manufacturing:

The creating of a global information society, has created new opportunities for the development of both software and hardware industries - as well as telecommunications equipment manufacturing. An integrated IT Policy requires emphasis on both software development - which would comprise a services sector, and a hardware sector, which would focus on absorbing manufacturing labor.

Some of the interviewees expressed skepticism about the possibility of developing a local manufacturing capacity, citing a glut in the global market in this segment. However, given that the software sector requiring technically skilled labor is likely to absorb only a limited labor, manufacturing continues to be important to developing countries, and more emphasis needs to be placed on this.

Tamil Nadu has great potential to become a major platform for labor-intensive manufacturing exports. It has all the critical ingredients required for a state to follow such a development strategy. Indeed, with a more open and deregulated economy, Tamil Nadu stands poised to

¹¹ Interview with D. Prakash, IT secretary, May 1999

repeat the export boom of China's southern provinces during the past two decades, based on low labor costs, the availability of managerial and engineering skills within, and the inflow of international capital and technology. Likewise the STPs in the IT sector, export processing zones (EPZs) in the manufacturing sector can play a major role in the overall growth strategy of the state. Virtually all of the East Asian countries have utilized export-processing zones (EPZs) to help attract foreign investment and to initiate the process of manufacturing export-led growth.

EPZs have not aimed to pick "winners" in the classic sense of industrial policy. Rather, they have attempted to carve out a geographical zone in which export-businesses can conduct profitable export-oriented activities, exempt from costly regulations, tax laws, and labor standards that apply more generally within the country. In general, the relatively successful industrial policies have had a few common characteristics: (a) they have aimed to promote exports, rather than to protect the domestic market; (b) they have provided subsidies on the basis of successful performance (e.g. the growth of exports) rather than to cover losses; and (c) they have given temporary rather than permanent subsidies (e.g. a five-year tax holiday for new export firms).

One of the key factors that ensured success of manufacturing private sector firms in the East Asian economies was a very healthy government involvement in business activities. The extent of government intervention in industry has differed markedly. Korea has surely been the most interventionist, rather closely modeling its industrial policies on Japanese institutions. Taiwan probably comes next in the extent of government intervention in industry, though with considerably more market orientation and reliance on small, family businesses as opposed to the large industrial conglomerates (chaebol) supported by state policies in Korea. Southeast Asia, by contrast, has shown considerably less government intervention in industrial policies than has Northeast Asia (Japan, Korea, and Taiwan). Hong Kong, for example, has maintained completely free trade, with zero tariffs, quotas, and licenses on merchandise trade.

Singapore as well has essentially maintained open trade, though with more government intervention via tax policies and other incentives. Indonesia, Malaysia, and Thailand have also pursued rather modest programs of industrial policy in comparison with Northeast Asia. All three have maintained relatively open trade since the 1970s, based on convertible currencies, modest tariff rates, and relatively free markets for capital and labor. While these three Southeast Asian economies have all engaged in some efforts to identify and promote industrial "winners," most of industrial growth, and especially the export growth, has taken place outside of these government-led attempts.

CONCLUDING REMARKS

Substantial impetus can be imparted to the growth process should the central government decentralize economic policy making and allow the states to make crucial economic decisions on their own. Brazil, China, and Russia are examples where regional governments have taken the lead in pushing reforms and prompting further actions by the central government. In Brazil, it is Sao Paulo and Minas Gerais which are the reform leaders at the regional level; in China, it is the coastal provinces, and the provinces farthest from Beijing, in the lead; in Russia, reform leaders in Nizhny Novgorod and in the Russian Far East have been major spurs to reforms at the central level. With controlled decentralization in China, for example, provinces have increasingly been competing with each other in terms of attracting investments, both domestic and foreign, and in providing better infrastructure facilities, among other things.

Greater decentralization of decision making in India is likely to lead to greater competition among the states and therefore to higher efficiency and productivity in these regions. In India, key fiscal, infrastructure, and regulatory decisions on economic management remain at the central government level. Essentially what this centralized system of governance implies is that the states have very little jurisdiction in, or control over, policy and regulatory decisions that would make the states more attractive to prospective investors. A gradual process of decentralization has begun in India as a result of the fact that regional political parties have been lending support in the formation and running of the government at the center. This is a healthy development. Coalition governments at the Center made up of regional parties representing different states can exercise a great deal of influence in policy-making at the Center. Also, this is the most plausible scenario in the Indian democracy wherein the Center is virtually forced to allow greater decision-making to be done at the state-level.

While it is true that the record of the coalition governments in India so far as stability at the Center is concerned is poor, but it is also important to recognize that coalition politics is rather new to the country, and with the passage of time is likely to mature. Regional parties having representation in the Central government can play a critical role and negotiate for greater decision-making authority to be transferred to the state-level. Policy making at the sub-national level is essential in order for state governments to be able to follow development strategies suitable to their socio-economic, cultural, and geographic characteristics. Coastal states, for example, can follow a more focused export-led growth strategy, or states with a large pool of trained manpower, such as IT professionals in Tamil Nadu or Karnataka can lay more emphasis on IT and service sector.

The Tamil Nadu government can influence the federal government's IT Policy to do much more to spur growth in the IT industry. On positive side there has been the federal government's long-term commitment to the Indian Institutes of Technology (IIT). Also, there has been the government's support for Software Technology Parks (STPs), in the different states. On the negative side, India's telephone density is abysmally low, at around 1.3 per hundred in 1995, compared with around 62.6 per hundred in the United States. Costs of international telephone calls made from India are among the highest in the world, largely due to lack of competition. Physical infrastructure for data transmission within India (e.g. fiber optic cables) remains

underdeveloped despite some progress made in this area during the past few years. Additionally, the lack of enforcement of intellectual property laws most likely inhibits inward investments in IT sectors. All of these problems are remediable through further deregulation of telecomm and FDI, as well as effective law enforcement in a more liberalized and competitive environment.

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APPENDIX 1 : List of People Interviewed

Government

Mr. G.S. Radhakrishnan, Dty. Secy, Dept. of Finance
Mr. Pravin Kumar, Jt. Secy, Dept. of Industry
Mr. M.S. Srinivasan, Secy, Dept. of Industry
Mr. D. Prakash, Secy, Dept. of Information Technology
Mr. Gnanadesikan, CMD, ELCOT
Mr. Neeraj Mittal, Executive Director, ELCOT
Mr. R. Gopalan, CMD, TIDCO
Mr. M.B. Pranesh, CMD, TACID
Mr. Satpathy, CMD, Power Finance Corporation
Mr. A. Balraj, CMD, SIDCO
Mr. S.S. Iyer, General Manager, Chennai Telephones
Mr. Gururaj, General manager, TIIC
Mr. Ramdoss, CMD, GUIDANCE
Mr. M. Velmurgan, Addl. Dir. GUIDANCE
Mrs. Rajlakshmi, Director, STPI
Mr. Willington, TIDCO
General manager, SIPCOT
Mr. K. Rajaraman, Executive Dir., TIDCO

Industry

Mr. Samson Manuel, Branch Manager, BPL
Mr. K. Srinivasan, Director, Pentafour
Mr. C.S. Sridhar, WIPRO
Mr. Gopal Srinivasan, CEO, TVS
Mr. K.V. Ramani, CEO, Future Software
Mr. Ravi Shah, Tata Consultancy Services
Mr. Vaitheeswaran, Tata Consultancy Services
Mr. Shankar, CBSI
Maj. Gen. RPRC Naidu, Metamor
Mr. A.T. Vijaykumar, GM, Hewlett-Packard
Mr. Ramnathan, SIP
Mr. Swaminathan, World-Tel
Mr. R. Sridaran, Mahindra Industrial Park
Mr. Shaktikanta Das, Mahindra Industrial Park
Mr. V. Balakrishnan, Polaris Software

APPENDIX 2

INFORMATION TECHNOLOGY INDUSTRY POLICY OF TAMIL NADU 1997

G.O.MS.No.300, IND (MIE.2) DATED 3rd NOVEMBER 1997

The Information Technology (I.T.) Industry in India is a fast growing segment of the Indian economy, with growth rates exceeding 50% per annum. In 1995-96, the Indian Information Technology Industry comprising hardware, software, peripherals and training had a turn over of Rs. 9037.85 crores. The Hardware Industry in India has mainly catered to the needs of domestic consumers, with only marginal exports. On the other hand, 60% of Software revenues are from exports, and the main growth is in this sector.

Tamil Nadu's contribution to the I.T. industry has been significant . The key elements which have made Tamil Nadu an important player in this area are availability of skilled and educated manpower, comparatively higher standard of educational institutions, reasonably good infrastructure, and lower costs of operation. Apart from these, the presence of an International Airport and a major Seaport in Chennai have also helped the growth of I.T. industry in Tamil Nadu. After the liberalization process in 1991, and especially after reduction of import duties on hardware in July 1996, multinational companies were able to export large volumes to India, thereby boosting the domestic market for both hardware and software.

Despite all these advantages, Tamil Nadu accounts for only 7% of the total revenue from hardware and software in the country. The turnover of the industry in Tamil Nadu in 1995-96 was Rs. 289 crores of which Rs. 139 crores was in hardware and Rs. 150 crores in software. The potential for growth of Information Technology in Tamil Nadu is enormous with I.T. penetrating all spheres, including Government Departments, educational institutions, Banking, shopping entertainment and a whole gamut of other consumer applications. The Industry while drawing up the program for the IX Five Year Plan has projected that by the year 2001-2002, I.T. revenue in Tamil Nadu will be of the order of Rs. 13,000 crores (Rs. 5000 crores in Hardware and Rs. 8000 crores in Software). The industry has predicted that this level of achievement can be obtained provided the State Government announces and implements an industry-friendly I.T. policy. With the aim of achieving the goals spelt out in the IX Plan and to focus attention on the I.T. Industry as an engine of growth in the State, it has been decided to formulate an industry – specific policy for the I.T. Industry.

Objectives of the Policy:

- To encourage and accelerate the growth of hardware and software industries and associated services in the State and to remove the bottlenecks for starting and running of such Units in Tamil Nadu.
- To increase both domestic and export earnings of software and hardware sectors in the State.

- To upgrade and develop manpower skills required for the I.T. industry by facilitating training, to accelerate the use of I.T. in schools, colleges and educational institutions with a view of providing skills and knowledge to the youth to make them fit for employment in this sector.
- To upgrade the quality of life the citizens of the State by facilitating access to consumer application of Information Technology.
- As part of the above objectives, the Government will also encourage use of I.T. in Government institutions and Departments with a view to improving productivity and efficiency of Government services, revenues and tax collections, and assist in the process of decision – making by Government, and monitoring of Government programs. A high Power Committee headed by the State Finance Secretary has been constituted to draw up a plan for phased use of I.T. in Government Departments. A separate policy paper will be prepared on this for speedy implementation.

Existing Incentives Available to the Industry:

- There is no system of Entry Tax or Purchase Tax in Tamil Nadu. I.T. Industry will continue to enjoy facilities of unrestricted movement of capital equipment including hardware, peripherals, captive power gensets, UPS sets and Telephone Exchanges, subject only to Sales Tax payments as per orders in force.
- Due to self-sufficiency in power, Tamil Nadu does not have power cuts for industry. The facility of uninterrupted power will continue to be offered to I.T. industry.
- Tamil Nadu has already announced fiscal and tax concessions for investments of various slabs starting from an investment of Rs. 50.00 crores (mega projects) upto investments exceeding Rs.1500.00 crores (super mega projects). The orders issued in G.O.Ms.No.43, Industries, dated 13.12.1992 (for ‘mega’ and in G.O.Ms.No.1, projects) industries dated 2.1.1996 (for ‘super mega’ projects) will be applicable for I.T. industries also in addition to other incentives.
- Capital subsidy as applicable to electronics industries @ 20% of fixed assets subject to a maximum of Rs. 20.00 lakhs¹² will be available for all I.T. industries, irrespective of their location in the State. Where the unit is also eligible for capital subsidy for backward / most backward areas, this special subsidy will become part of such subsidy. The existing incentives available for industries employing at least 30% of women workers will also be available to I.T. industries.

¹² Lakh = 100000

New Initiatives:

- The State Government will set up Information Technology Parks (ITPs) at Chennai, Coimbatore, Tiruchirapalli and Madurai in a phased manner through ELCOT during the IX Plan period in association with the private sector. The ITPs will have full-fledged facilities with adequate modules for software development as well as sites for non-polluting hardware units, commercial and residential areas, schools, Convention and Business Centers as well as the connectivity required for communication and information exchange globally.
- Apart from ITPs in the Government and joint sectors, Government will facilitate setting up of ITPs by the private sector in potential locations for the development of I.T. industries. Private ITP developers will be given assistance in land acquisition and re-zoning, wherever required, by State Government. State Government will also facilitate provision of water, power connection and roads. State Government will also help the ITP promoters in obtaining necessary cable and satellite links through VSNL/DOT for the necessary connectivity. An ITP will be treated as an "industry" and be eligible for backward area capital subsidy and ST benefits.
- The Government will provide assistance to VSNL and Department of Telecommunications to expand communication links in the State and also provide the land and power wherever required by such agencies. State Government will liaise with Govt. of India to ensure dedicated VSNL connectivity / Earth Stations as well as Electronic Telecom facility for each ITP.
- All ITPs set up by private promoters will have the same status as ITPs promoted by Govt. agencies for the purpose of eligibility for the concessions / incentives granted by Government from time to time to SIPCOT, ELCOT, TIDCO and TACID industrial estates, subject to conformity to certain quality standards, and subject to location (whether backward / most backward area). Units in private ITPs will be entitled for exemption from stamp duty and registration charges at the time of allotment of sites / built up space as in the case of units in ELCOT / SIPCOT industrial estates. Private ITP promoters will be granted exemption of tax for works contracts within the complex as in the case of SIPCOT / ELCOT, etc. Software / hardware units set up in private ITPs established in accordance with the standards prescribed by the Government will enjoy the same facilities and incentives on par with units in Government industrial estates.
- In all the Technology Parks set up by Government & Joint Ventures, there will be an Executive Authority of the Park which will function as the Single Window for all statutory clearances required for the units, within the Parks. In the case of private sector Technology Parks, ELCOT will assist in getting all clearances fast.
- Apart from development of software and hardware Industry through ITPs / STPs the Government will also encourage software development outside the Parks by giving such stand-alone units the same incentives as the Units in the ITPs / STPs. There will be no

locational restrictions for setting up units exclusively engaged in software development / training.

- All software industries including Services and Training Institutions in I.T. will be entitled to "Industry" status. Such units shall be eligible for all concessions and incentives applicable to Industries. For the purpose of this clause, accredited Training Institutions will also be eligible to claim industry status, subject to certain norms which will enable them to obtain Term Loans and Bank Finance at industry rates.
- Government will provide continuous power supply in industry rates to all I.T. units, whether set up in ITPs, or in stand-alone locations, and also ensure quality of power as required by the industry. Software Training units will also be eligible for these facilities.
- For the purpose of power tariff, maintenance and servicing units and hardware units will be treated as industrial and not commercial consumers and electricity staff as applicable to Industry consumers will be charged.
- All software industries will be exempted from the purview of Tamil Nadu Pollution Control Act. Hardware units will require clearance from Pollution Control Board as applicable to other industries.
- Government of Tamil Nadu will also facilitate setting up of a T-Net with an "Information Back bone" connecting all District Head Quarters, using the Cable TV network all over the State whose penetrating at present is 4 times that of Telephone lines.
- Government of Tamil Nadu will encourage setting up of Venture Capital Fund for development of I.T. Industry through TIDCO in association with private sector partners.

Human Resource Development:

A subgroup set up to discuss the prospects of the Information Technology Industries in the IX Plan period has assessed the manpower requirements for the industry. The subgroup has estimated that Tamil Nadu manpower in the Information Technology Industry by the end of the Plan period. The following are the policy initiatives planned for Human Resources Development in Information Technology

- Government of Tamil Nadu will set up an Information Technology Institute of Tamil Nadu (TANITEC) to take care of the training and technology upgradation aspects of I.T. in the State. The Institute will also co-ordinate in preparation of syllabus for I.T. courses in Colleges and Technical institutions, create Centers of Excellence in Universities, and also support funded research program and specific technology applications.
- Training Institutes for hardware, software, servicing and maintenance will be deemed to be "Industries " and will be eligible for all facilities offered to Industries including Bank Finance and SSI or IEM registration. Certification for Software training will be governed by existing

standards prescribed by the Department of Electronics, Government of India. For quality certification of training in hardware, servicing and maintenance ELCOT will be the Nodal Agency to prescribe minimum standards for eligibility.

- Basic training in computers will be introduced in all schools from the high school level. The endeavor will be to cover all schools within a 5-year period. Training of teachers will also be done in a phased manner over the 5-year period. In addition to Government sponsored training programs, State Government will facilitate and co-ordinate with other sponsors like INTEL, IBM, APPLE, etc., for training of teachers.
- Government of Tamil Nadu will encourage I.T. industries to obtain ISO 9000 process certification. Small Scale Industries (SSIs) will be eligible to claim the incentives offered by TIIC for obtaining such certification.

Special Assistance for Information Technology Industry:

- Government of Tamil Nadu will offer relaxation of FSI (Floor Space Index) in metropolitan areas to the extent of 50% for IT. Parks.
- Government of Tamil Nadu will co-ordinate with Government of India facilitate setting up of 'Internal Container Depot' to take care of exports of specified industrial products through Chennai Port, including products of electronic and hardware units.
- Government of Tamil Nadu will facilitate setting up an Air Freight City near Chennai Airport, for improving the cargo movement for imports and exports from Chennai Airport. The Air Freight Center will have sufficient space for handling equipment and necessary facilities for customs clearances, with staff posted round the clock. Such a center will be formed as a Joint Venture between TIDCO, TACID, and FIEO. With these facilities, Government of Tamil Nadu will facilitate a 72-hour cycle for import of components and export of finished products by the hardware units.

APPENDIX: Concessions/Incentives Available for Industries

Special Subsidy for Mega Projects:

- An industry set up anywhere in Tamil Nadu having an investment of Rs.50 crores and above and below Rs. 100 crores is eligible for a Capital subsidy of Rs. 25 lakhs.
- An industry set up anywhere in Tamil Nadu with an investment of Rs. 100 crores and above and below Rs. 200 crores is eligible for a subsidy of Rs. 50 lakhs
- An industry set up anywhere in Tamil Nadu having an investment of Rs. 200 crores and above is eligible for a Subsidy of Rs. 100 lakhs.

Additional Subsidy for Employing Women Workers:

New industrial units (small, medium or major) where more than 30% of the total workers employed are women shall be eligible for an additional Capital Subsidy of 5% of investment in fixed assets subject to a ceiling of Rs. 5 lakhs.

Special Subsidy for Electronics Industry:

Electronics – 20% of fixed assets subject to maximum of Rs. 20 lakhs.

APPENDIX 3: List of Websites Related to Tamil Nadu Economy

Electronics Corporation of Tamil Nadu (ELCOT)

<http://www.elcot.com/>

TIDEL Park

<http://www.itparkchennai.com>

Tamilnadu Industrial Guidance and Export Promotion Bureau (GUIDANCE)

<http://www.focustamilnadu.com>

Tamil Nadu Industrial Development Corporation (TIDCO)

<http://www.tidco.com>

Tamil Nadu Corporation for Industrial and Infrastructure Development Ltd. (TACID)

<http://www.welcometacid.com>

Software Technology Parks of India

<http://www.stpi.soft.net>

International Tamils Business and Professionals Online

<http://intamm.com/index.htm>

Tamil Nadu Telecom Circle

<http://www.tamilnadu-telecom.com/>

Tamil Nadu Industrial Corporation Limited (TIIC)

<http://www.tiic.org>

Tamil Nadu Chamber of Commerce and Industry

<http://epages.webindia.com/india/tn-chamber>

Tamil Nadu Foundation, Inc.

<http://www.webindia.com/np/us/tnf.html>

Small Scale Industries Association of Tamil Nadu (TASTIA)

<http://www.tanstia.org.in/>

Anna University, Tamil Nadu, Chennai

<http://www.annauniv.edu/>

Tamil Nadu Information

<http://www.indiaavenue.com/>