Development through Information Technology in Developing Countries: Experiences from an Indian State

Dr. K.G.K. Nair,
Principal, University College of Engineering
Trivandrum-690581, Kerala, India
E-mail: gopolmanjusha@yahoo.com

and

P.N. Prasad
Faculty member, State Institute of Rural Development
E.T.C. (P.O), Kottarakara-691531, Kerala, India
E-mail: pnprasad_2000@yahoo.co.uk

Abstract
Kerala, one of the federal states of India, is a region known for its high levels of achievements in education, healthcare and social justice despite low per capita income. In line with global trends, in 1998 the government of Kerala formulated an Information Technology (IT) policy. The policy aims at increased application of IT in all walks of life, enhancing the IT industry base, creating a robust state information infrastructure and creating human resources for IT. The paper discusses the government’s initiatives, achievements and limitations in the implementation of the IT policy. The paper identifies the pitfalls in the present IT policy and suggests suitable solutions. The study shows that, in spite of financial constraints, Kerala has made significant achievements in E-governance. The findings of the study also reveal the need for better strategies for promotion of IT industries and PC penetration. The paper also emphasises the need to mobilise additional resources to achieve the policy objectives.

Keywords: Information Technology, IT Policy, E-governance, IT Industry, Kerala

1. Introduction
Kerala, known far and wide as ‘God’s own Country’, is a unique state that achieved many distinctions of all-round improvement in the social sector. Despite low per-capita income, the state’s achievements in literacy, education, health, etc. are comparable to some of the developed countries. If it were a separate country, Kerala would have been one of the poorest in the world, with a per-capita income of only US$440 (1999). This is hardly 1.4% of the average per capita income of the US, which was US$31,910 in 1999 (World Bank 2001). It may be noted that Kerala has an effective literacy rate of 90.59% against 99% in the US.

In the context of developing countries, IT is seen as one of the most significant forces of modernisation. In the global ‘information society’ the various indicators of diffusion of IT are a characteristic of development (Avgerou, 2000). Kerala has all the intrinsic advantages that can foster the growth of IT for social and economic development. Kerala has advanced levels of literacy, education and healthcare, an excellent telecommunications network reaching all towns and villages, educated women, availability of world class IT professionals, and three international airports viz. Trivandrum, Cochin and Calicut.

Before 1995, the Government of Kerala did not make any serious attempt for the promotion of IT, probably due to the widespread misconception in the minds of the trade unions and common people that the increased application of IT may replace the manpower,

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resulting in loss of employment. However, the growth of IT in nearby states and all over the world along with the lucrative jobs obtained by Keralites in IT outside the state were eye-openers and the potential of IT in creating large scale employment was realised by the state, albeit a little late. Once the mindsets of the people started to change, the Government of Kerala stepped up its intervention by announcing a comprehensive IT policy in April 1998. The Government of Kerala also established a new IT department for promotion of IT in the state.

2. IT Policy Mission

The Government understands the enormous potential of IT, not only as a tool for improving governance and creating more jobs, but also more significantly as a means to enhance the standard of living of the people. The IT policy aims at increased application of IT in all walks of life, enhancing the IT industry base, creating a robust state information infrastructure and creating human resources for IT (Government of Kerala, 1998a). The IT Policy mission is spelt out as follows:

- **Upgrading of the standard of living of the people of the state through use of IT in all sectors as a tool to enhance productivity, efficiency and optimum utilisation of resources, and through full exploitation of the employment potential of the IT sector.**

- **Establishment of a State Information Infrastructure (SII) comprising a high speed broadband communication backbone, nodes, access network, distributed data warehouses and service locations to cater to the needs of trade, commerce, industry and tourism and also to enhance the delivery of government services to the people.**

- **Establishment of the state as a fertile location for the growth of the IT industry, facilitating the flow of investments from within the country and abroad, achieving in the process, the rapid growth in domestic and export earnings.**

- **Development of human resources for IT through increased use of IT in educational institutions and through academic and training programmes that improve the employability of educated youths in the IT sector.**

- **Facilitation of decentralised administration and empowerment of people through the application of IT.**

Components identified for the speedy and effective realisation of the policy mission are:

- **Diffusion and dissemination of IT**

- **Enhancement of the industry base of IT**

- **Creating a robust information infrastructure for the state**

- **Human resource development for IT**

The mission targets for promoting the use of IT in various fields for diffusion and dissemination are:
• PC penetration of 10 per 1000 of the population by year 2001
• All colleges to be connected to the Internet by 2000 and all schools by 2002
• Information kiosks in every panchayat ward, accessible to any member of the public.
• Modernisation and integration of government functioning using IT

Generally, any policy is for a period of 3 years and now it is time for the government to produce a revised policy. At this juncture, it is important to have a stock taking of the current policy achievements.

3. Policy Initiatives
In line with the policy, a high power committee was constituted under the chairmanship of the chief minister of the state to co-ordinate and direct strategies to achieve rapid penetration and effective use of IT in all sectors. Three broad areas have been identified and separate task forces were constituted for:

• Human Resources Development and IT Dissemination
• Enhancing the IT Industry base
• IT implementation in government

A state advisory council on IT was also constituted with N. Vittal (Former Secretary, Department of Electronics, Government of India) as Chairman. The council, in its report submitted to the government, suggested that the IT policy objectives must be achieved within 1000 days starting from 1st December 1998 (Government of Kerala, 1998b). During this three-year period the government has initiated many programmes and projects for the development of the IT base in Kerala. These are:

3.1 IT Implementation in Government Departments
The IT task force on IT implementation in government has identified the departments in which there is a high level of interaction with the public and other departments, where computerisation shall facilitate increased revenue collection. The task force identified and listed 31 such departments for IT implementation in the first phase (Government of Kerala, 1998c). The government has earmarked 3% of the state budget for implementation of IT action plan. The treasury department, registration department, civil supplies department and motor vehicles department have implemented model projects in selected locations. By computerising the functions like office procedures, documentation and delivery of services, common people are getting the services more efficiently. The remaining departments have also procured necessary hardware and software and the officials were trained in computer usage.

3.2 Information Kerala Mission
The IT policy of the Kerala government has focused on the application of IT in a decentralised democracy. Computerisation of village level administration was given a high priority in the IT policy of Kerala. The Kerala Information Mission, which was set up in 1998, is a trendsetter in the deployment of technology at the grassroots level and a model for
participatory governance through the effective use of IT. The project aims at modernisation and integration of government functions using IT by networking and computerising the local self-governments to expedite project implementation and transactions like issue of certificates, licensees, tax collection etc. To date, two modules involving a) the monitoring of plan implementation and b) certificate issuing are ready for use. The project also envisages massive awareness programmes through training and orientation at all levels of village, district and state government bodies. The government has achieved significant success by developing Kumarakom panchayat in Kottayam district as a role model. For the first time in the country a project for establishment of computer information network covering all the 152 development blocks and district headquarters has been completed.

3.3 FRIENDS
FRIENDS (Fast, Reliable, Instant, Efficient, Network for Disbursement of Services) is set up in every district headquarters by the IT department. FRIENDS is a unique project taken up by the government to provide the benefits of IT to the common man. This offers the citizen an integrated point for utility payments for specific services such as Electricity charges, Water charges, Property tax, Professional tax, Building tax, etc. The server of the FRIENDS centre is being linked to the server of the concerned departments for updating on a real time basis. A friendly ‘Help Desk’ helps the customers to fill up forms and clarify their doubts. The project when completed is expected to benefit 12 million people of the state i.e. about 40% of the population.

3.4 SEVANA
With a view to disseminate increased application of IT to the rural people, in association with the library council, the IT department has started a novel project called SEVANA. The project envisages converting about 400 libraries in rural areas into IT dissemination centres by providing free Internet connections so that they can function as rural information centres. A software package named SEVANA provides information on various government schemes, programmes, general information on local bodies, links to important sites, and other important facts relevant to the rural population. The pilot project, which was implemented in Kallara Panchayat in Trivandrum district, has been functioning very well. The centre became a point of convergence for villagers seeking information services and an entry into the world of computers and computer literacy. The people from rural areas are able to get various utility services through the Internet. Training for Internet awareness is also being organised in these centres.

3.5 PEARL
PEARL (Package for Effective Administration of Registration Laws) is a joint project of the Registration Department, the IT Department and the National Informatics Centre. The project is being implemented as a major initiative of the government towards providing the benefits of IT to the common man. The National Informatics Centre is the overall consultant for the project, including its design and development. PEARL aims at providing a transparent, efficient and vibrant public interface thereby bringing in efficiency and motivation at the Sub Registry office level. This dispenses with the dreary manual routine of filing, searching, accounting, reporting etc. This in turn should lead to a drastic reduction in the number of opportunities for corruption, thereby enhancing the satisfaction and awareness at the general public level. This also provides the common man with the power of getting prompt and reliable response from the department.

The project for computerisation of the Registration Department of the state aims to reduce document registration time from two weeks to a few hours and bring more
transparency into the functioning of the state-wide department. The main feature of the project is that the existing registration system is being replaced by a system of online processing. For this, every sub registry office would have a local area network with adequate terminals for customer servicing. Computerisation will cover registration of all categories of documents, issue of encumbrance certificate and issue of certified copies. The advantages of PEARL include registration of documents within one hour as against two weeks, and issuing of encumbrance certificates in 10 minutes instead of the existing situation, where it takes up to one week. Certified copies of documents can be issued within a minimal time, as maintenance and filing of documents is being done electronically. Data warehousing and retrieval system are an integral part of the package. The entire process of document writing and registration is substantially simplified, as document writers are no longer required to prepare filing sheets, in the new computerised system. Moreover, the implementation of the project would pave the way for transparency in the Registration Department and enable more effective monitoring. It would also enhance the revenue collection in the state.

3.6 Indian Institute of Information Technology & Management – Kerala (IIITM-K)

IIITM-K is conceived as a centre of excellence, on par with the IITs (Indian Institute of Technology) and aims to train skilled professionals in leading IT and Management disciplines. The institute is located in the campus of Technopark- India’s most advanced destination for IT. This institute, establishment of which has been envisaged in the IT Policy of the Government of Kerala, is conceived as a national level institution and will offer a range of Masters Programmes in leading IT disciplines. An important feature of the institute is the significant levels of industry participation in the governance of the Institute and in the design of the curriculum. The institute will offer two sets of academic programmes- Masters Programmes and Short Term Professional Programmes. The full time Masters Programme will be the core programme of the institute. This programme - the Masters Programme in Information Technology (MiTech) - will be structured so as to sensitise the participants to key issues of IT: Business and Management. In addition to these academic programmes, the institute will also offer professional testing and accreditation services for private training institutes.

Ongoing programmes of computerisation in government departments, local self-governments, and other government and private institutions in Kerala will open up a huge domestic market. The software companies engaged in software production for domestic sales are likely to achieve a quantum jump in their turnover. Consequently, there will be a large requirement for qualified software personnel. At present, the state is producing about 8,000 professionals annually with qualifications like, M.Tech, B.Tech, MCA (Master of Computer Applications) and PG Diploma in computer related subjects. The state government has recently embarked on a major policy initiative of liberalising the professional and higher education sector of the state. The government has multiplied the number of technical seats in the IT sector (including engineering degrees and MCA). In this context, it is to be admitted that the number of IT professionals that the state produces is much smaller than Karnataka, Tamilnadu and Maharashtra, which have been following a liberalised educational policy for some time. With the liberalisation of the technical education sector in Kerala, the number of seats available is expected to be increased four fold in the next five years. As per the survey, conducted by the government of Kerala, there are 1,553 educational institutions engaged in computer education and training (Government of Kerala, 2000). The turnout from these institutions will be sufficient enough to meet the manpower requirement, in line with the state’s ambitious plan for software production.
3.7 Right of Way Policy - Drive for IT Infrastructure
The government of Kerala declared the right of way policy, permitting any private or public sector infrastructure providers who propose to lay fiber optic cables to have right of way over public properties including national and state highways, village roads and other public properties on a non exclusive basis. Accordingly, the government has already finalised agreements with infrastructure providers and the work has been progressing. This should enable the construction of a fiber optic backbone right across the state and would ensure that high speed Internet connectivity is available in all district headquarters of the state.

3.8 Information Kiosks
To own a PC, a modem and a telephone connection, the user end requirements of Internet, is a distant dream for the common man in Kerala. However, it must be remembered that in Kerala, the common man enjoys the communication facility not by owning a telephone, but through the telephone booths available in every nook and corner of the state. As per the IT policy, one of the mission targets was the setting up of Internet kiosks in every Panchayath ward, accessible to any member of the public. The Kerala State Electronics Development Corporation (KELTRON) has already set up Keltron Information Kiosks (KIK) in three locations in Trivandrum district and the service is proposed to be extended in all the districts of the state. The objective of the centre is to enable the government to provide quick service to the common man through the strength of IT (Kumar, 2001). The focus of KIK is to generate content that is locally specific. KIK are value added cyber cafes providing various services related to government through the Internet and LANs that cater to the everyday needs of the masses. The KIK envisages an E-governance grid by networking government departments, institutions and other agencies involved in governance. The goal of the E-governance grid is on the one hand to enable the government to improve delivery of various services and on the other to empower the citizens to actively participate in the digital revolution, both as clients of government services and also partners in creating, maintaining and disseminating information, which is locally relevant and specific.

3.9 Promotion of the IT Industry
The IT policy gives considerable emphasis to the promotion of the IT industry. It has been followed by a number of activities exclusively for promotion of the IT industry. The Government has announced many incentives and concessions as listed below:

- IT industries will continue to be exempted from the purview of the Pollution Control Act
- Priority will be given for IT industries in sanctioning and servicing of power
- Exemption from sales tax to IT industries will be granted for seven years.
- For captive power generation sets installed by IT Industries, a 50% subsidy will be granted for installation of captive generation sets and there will be exemption from payment of electricity tax/duty.
- All IT units are eligible for subsidy of 20% of capital investment subject to a maximum of Rs.2.5 million.

The Government has promoted IT industries in Technopark and the Software Technology Park in Trivandrum, IT parks promoted by KINFRA (Kerala Industrial Infrastructure Development Corporation) in Cochin and Calicut and Cochin Export Processing Zone. The Technopark in Trivandrum, with a built-up area of 800,000 ft² is India’s most cost effective IT destination. There are 50 IT companies in Technopark and these companies provide employment for 5,000 professionals. However, the state’s software exports in 2000-2001 only came to Rs.1,100 million (US$24 million), which is only 0.39% of...
India’s software exports. In the state of Karnataka, software exports reached Rs.74,750 million (US$1,495 million) during the same period, surpassing the targeted figure of Rs.64,000 million (Government of Karnataka, 2001).

4. Analysis
The broad purposes of the IT Policy in the state are: 1) to contribute substantially to provide jobs for Kerala’s 4 million unemployed people and 2) to ensure that the state administration becomes citizen-friendly. The government has definitely achieved success in creating a conducive atmosphere by removing the apprehensions of the trade unions, employees and the people regarding misconceptions about the computerisation. In a democratic country like India, co-operation and participation of the people is a necessary condition for adaptation of any new technology. The people-friendly projects like FRIENDS, SEVANA, PEARL, etc. have strong promotional effects as the general public begin to realise the potential of applying IT in day-to-day life. The pace of improvement that IT has brought in the Registration Department can be guessed from the fact that earlier it took two to three weeks for verifying the documents, but today it is done within less than an hour. In general, the perception of people has changed and they have begun to support and participate in IT promotion. The computerisation in Kumarakom panchayat is a good example of the encouragement and participation of the people. ‘IT Kerala 2000’, an exhibition cum investor meet conducted from November 23-26, 2000 - the first ever national level IT event in Kerala, attracted nearly 30,000 business visitors and over 100,000 general visitors. This is testimony to the changing mood of the investors and the general public in Kerala (Kunnappally, 2001).

The use of IT in enhancing the delivery of government services is aimed at creating a very responsive and transparent administration. This facilitates the empowerment of the people and satisfies their right to information.

The IT Policy of the state aims to achieve everything possible with the application of IT. It seems to be a little bit over-ambitious. Does the state have the resources to implement all these projects in one stretch? Even though 3% of the state budget has been earmarked for the IT sector, this was not enough to implement all the projects. In order to ensure that benefits reach to the rural poor, these projects are to be implemented throughout the state. This will involve a huge outlay of funds and the state should have a more realistic approach for fund mobilisation. The financial limitations of the government have also affected the pace of implementation of various E-governance projects. As suggested by Vittal (1999), the government should lease computers instead of purchasing them. If the government goes for leasing with a capital of Rs.500 million, Rs.5,000 million can be leveraged.

It is noteworthy that the government has achieved good progress in achieving the projected target of state information infrastructure development. The completion of ongoing projects in IT infrastructure will provide connectivity at 2 mbps to any user in the major cities of the state and in multiples of 64 kbps in other parts of the state. The submarine cables SEA-MAWE (connecting Australia, South East Asia, the Middle East and Western Europe) and SAFE (connecting South Africa to the Far East) are being extended from Cochin to other parts of Kerala under project “100 percent digital Kerala” and by 2002 bandwidth can be provided to any user as per his requirement. This will make the state a highly attractive base for the high-end infotech companies.

The success of E-governance project depends on the E-awareness of the people. As computer literacy of the state continues to be poor, there is need for a clear strategy to enhance PC penetration and this is a pre-requisite towards the destination of being an E-governance state.
Table 1: PC Penetration Rates in Selected Developed and Developing Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of computers per 1000 population</th>
</tr>
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<tbody>
<tr>
<td>USA</td>
<td>510.5</td>
</tr>
<tr>
<td>Canada</td>
<td>360.8</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>297.6</td>
</tr>
<tr>
<td>Japan</td>
<td>286.9</td>
</tr>
<tr>
<td>Germany</td>
<td>297</td>
</tr>
<tr>
<td>Norway</td>
<td>446.6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>461.9</td>
</tr>
<tr>
<td>Finland</td>
<td>360.1</td>
</tr>
<tr>
<td>Singapore</td>
<td>436.6</td>
</tr>
<tr>
<td>UK</td>
<td>302.5</td>
</tr>
<tr>
<td>South Korea</td>
<td>181.8</td>
</tr>
<tr>
<td>Malaysia</td>
<td>68.7</td>
</tr>
<tr>
<td>India</td>
<td>3.3</td>
</tr>
<tr>
<td>China</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Source: World Bank, 2001

It can be seen from Table 1 that the developed countries have a high rate of PC penetration (World Bank, 2001). One of the IT policy targets was to enhance PC penetration to 1% of the population in Kerala by the year 2001. This itself is a modest target. If the state has to achieve E-governance as envisaged, it is necessary to have PC penetration of at least 2%. The state should have a clear policy for encouraging individuals to buy PCs by offering incentives in the form of soft loans or tax deductions. The policy of the Malaysian government can be followed in this case. The Malaysian government has launched an IT awareness campaign throughout the country and has provided tax deductions for first-time buyers of personal computers, among other things (Nain and Mustafa, 1998).

For many people as well as institutions, computerisation means procurement of hardware only. In the majority of cases, people do not go beyond using standard application packages, resulting in gross under-utilisation of computers. Computers are being used as a personal tool of a few officers rather than as a tool to improve system performance. In some departments, computers are not being made available to the trained personnel. Time and resources are seldom spent to develop application packages for specific purposes, which are essential for any meaningful computerisation programme. There is considerable enthusiasm at the department level, driven by forward-looking individuals, but a cohesive movement is lacking. For a meaningful computerisation of government departments, it is required that the computers should be maintained properly by the trained manpower. Also, software packages suitable for the office specific application should be designed for the delivery of services to the citizens. Shortages of consumables, service problems, lack of trained manpower, etc. should not come in the way of the proper functioning of the computers.

There is a distinct need to reorient the employees so as to meet the challenges of the future. Since the purpose of field level computerisation is to improve management, it requires sustained training efforts and technical inputs. Training needs to be oriented towards the use of information by the workers, supervisors and managers for strengthening, planning and monitoring activities (Bhatnagar, 2000). Training can and must play an important role in improving the skills and quality of the government services. Employees should be encouraged to make learning into a highly self-motivated activity for the acquisition of new skills.
knowledge and skills. As it will be difficult to train a whole generation of government servants in IT quickly, the private sector computer companies must be called upon to provide equipment as well as services. This could be on a lease basis so that the government can manage with limited financial resources. The problem of disposal of old equipment will also not arise. The government can thus ensure that it always has the latest IT system. Training programmes will have to be an ongoing feature in government especially in the light of rapid changes in technologies and applications.

The foregoing discussion suggests that as far as E-governance is concerned, with a few exceptions, the state is moving in the right direction. The state has initiated many innovative projects in E-governance. However, the pace of various E-governance projects needs to be accelerated to deliver services to citizens. It is a logical conclusion that all the government departments and local self-governments in the state will have excess manpower after successful implementation of various E-governance projects. This is likely to affect the availability of new job opportunities in the government sector. However, the growth of E-governance will create large-scale employment opportunities in the private sector, especially in IT fields such as IT enabled services, IT training and equipment servicing.

In spite of the fact that the state has a large number of talented IT professionals and its other intrinsic advantages, which are conducive to quick growth of the IT industry, the actual performance is not up to the level of expectations. Even though the state has established world class facilities through exclusive IT parks and other IT infrastructure facilities, these are not attracting foreign and indigenous investment to the desired extent and indeed are being under-utilised. In spite of the fact that the state has invested heavily, it could achieve software exports of only Rs.1,100 million (US$24 million) for the year 2000-01. It may be noted that during the year 2000-01, software export figures of neighbouring states Karnataka, Tamil Nadu and Andhra Pradesh were Rs.74,750 million (US$1,635 million), Rs.31,160 million (US$681 million) and Rs.19,170 million (US$419 million) respectively. According to the latest findings by the Electronics and Computer Software export promotion council (ESC), the state of Karnataka is the largest contributor to the export of computer software. The leading industrial state, Maharashtra, with its export contribution of Rs.42,750 million (US$933 million) is in second position. The state of Kerala has some consolation, when its performance is compared with the states like Gujarat and Punjab that have relatively higher per capita income. In spite of the investor friendly policies of the respective governments, Gujarat and Punjab could achieve software exports of only Rs.1,080 million (US$24 million) and Rs.520 million (US$11 million) respectively.

Though, there have been large variations in software exports from state to state, at the national level, the exports from Indian software industry continue to show impressive growth rates. In terms of Indian rupees, the C.A.G.R. (Compounded Annual Growth Rate) over the past five years has been as high as 62.3%. The industry exported software and services worth Rs.300 million in 1985. However, in 2000-2001 a total export of Rs.283,500 million (US$6.2 billion) was achieved and it is expected that during 2001-2002 software exports will be worth Rs.400,000 million (US$8.5 billion) (NASSCOM, 2001) (See Figure 1).
Figure 1: IT Software Exports in India, 1995-2001 (NASSCOM, 2001)

As per the survey conducted by the NASSCOM (National Association of Software and Services Companies), more than 3000 companies in India are engaged in the business of software exports. The top twenty-five software exporters (in the order of revenue) accounted for almost 60% of the software exports revenues in 2000-2001 (NASSCOM 2001). It can be seen from Table 2 that none of the country’s top twenty exporters of software has an IT production base in Kerala. This can be viewed in the context of the overall industrial backwardness of the state. Nevertheless, the potential of the IT industry for the future development of the state should not be underestimated. For exploiting the advantages, the state should come out with suitable strategies to encourage domestic and foreign promoters to invest in this ideal IT destination.
Table 2: The Top Twenty Software Exporters (Based on Revenue) in India
(NASSCOM, 2001) (http://www.nasscom.org)

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Exports in Rs. Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tata Consultancy Services</td>
<td>28,702.60</td>
</tr>
<tr>
<td>Infosys Technologies Ltd.</td>
<td>18,529.40</td>
</tr>
<tr>
<td>Wipro Technologies</td>
<td>17,563.90</td>
</tr>
<tr>
<td>HCL Technologies Ltd.</td>
<td>11,269.20</td>
</tr>
<tr>
<td>Sathyam Computer Services Ltd.</td>
<td>12,412.20</td>
</tr>
<tr>
<td>Cognizant Technology Solutions</td>
<td>7,030.80</td>
</tr>
<tr>
<td>Silverline Technologies Ltd.</td>
<td>6,474.40</td>
</tr>
<tr>
<td>NIIT Ltd.</td>
<td>5,700.20</td>
</tr>
<tr>
<td>Penta Soft Technologies Ltd.</td>
<td>5,555.00</td>
</tr>
<tr>
<td>Penta Media Graphics Ltd.</td>
<td>5,480.20</td>
</tr>
<tr>
<td>Penta Computer System Ltd.</td>
<td>5,156.00</td>
</tr>
<tr>
<td>IBM Global Services Ltd.</td>
<td>5,060.20</td>
</tr>
<tr>
<td>Mahindra British Telecom Ltd.</td>
<td>4,499.80</td>
</tr>
<tr>
<td>HCL Perot System</td>
<td>4,392.40</td>
</tr>
<tr>
<td>DSO Software Ltd.</td>
<td>4,381.70</td>
</tr>
<tr>
<td>Mascot System Ltd.</td>
<td>3,398.70</td>
</tr>
<tr>
<td>Mascom Global Ltd.</td>
<td>3,386.90</td>
</tr>
<tr>
<td>i-Flex Solutions Ltd.</td>
<td>2,937.40</td>
</tr>
<tr>
<td>Tata Infotech Ltd.</td>
<td>2,880.30</td>
</tr>
<tr>
<td>Mphasis BFL Ltd.</td>
<td>2,833.10</td>
</tr>
</tbody>
</table>

Total: Rs.157,644.4 million

The IT policy proposes the establishment of Internet kiosks in every panchayat ward, accessible to any member of the public. The government should learn from the bitter experience of TV kiosks started in rural areas in the past that ultimately stopped functioning due to lack of maintenance support. Another reason for the failure of TV kiosks was that the users did not find any value addition, as the system was not interactive. Hence, the project on Internet kiosks is to be implemented with people’s participation and it should also be capable of providing various services to the general public using the strength of IT. The projects related to the Internet in schools and colleges are not progressing as per the schedule and are unlikely to achieve the targeted figures. This is going to be a serious set back in the state’s effort for higher levels of computer literacy, PC penetration and E-governance. A massive effort must be made to see that all the schools and colleges have the requisite number of computers and Internet connectivity.

It is true that the state has taken a number of initiatives in tune with the IT policy. How far have these initiatives helped the state to realise the policy mission? Projects like FRIENDS, SEVANA, PEARL, and Information Kiosks are good examples for the use of IT for the benefit of the general public. However, these projects, which improve the service delivery of the government to the citizens, have been established in only a few locations, primarily in urban/semi urban areas. The majority of the rural population has yet to benefit from these projects. The infrastructure projects undertaken by the government have been successful in creating a conducive environment for the development of IT in the state. As envisaged in the IT policy, the state has been developed as a fertile location for the growth of IT industry, through many infrastructure projects and other initiatives. However, the failure of the state to attract the leading Indian entrepreneurs and multinational companies should be...
studied in a broader perspective. The massive investment in infrastructure development will be justified, only when the state shows much improved performance in the development of its IT industry. The policies of the government and other initiatives have accelerated the development of human resources for IT. Through the liberalisation of the technical education, the state is determined to ensure adequate manpower with appropriate skills in IT. The efforts of the government for facilitation of decentralised administration in tune with the mission are appreciable. The computerisation of local self-government has been progressing at a fast pace. The various services from these offices like issue of certificates, licenses, tax collection, etc. are expected to become a reality in the near future and the rural population is also being brought under the ambit of application of IT.

5. Conclusion
The overall achievement in IT sector is significant for a state that has only a meager per capita income. Despite the financial constraints, the state has made significant achievements in E-governance, which shows the commitment of the government to enhance the delivery of services to citizens. However, it may be noted that a huge financial outlay is required to be mobilised for the fully fledged implementation and maintenance of various E-governance projects throughout the state.

Despite heavy investment on building up IT infrastructure, the growth of IT industries is not commensurate with the potential of the state. A detailed analysis is required to identify the problems and prospects of the IT industry. Similarly, the present level of PC penetration must be a matter of serious concern. It may be noted that large-scale investment in building up state level IT infrastructure will not produce desired returns without deeper PC penetration.

In a democratic country like India, where 40% of the people are still living below the poverty line, mobilisation of huge investment required for the implementation and maintenance of E-governance projects is not very easy. While all these government services are generally free or subsidised, the required resources should come from the returns of the IT industries. Hence promotion of IT industries through foreign and domestic investment needs to be the priority of the government. The state should take a tip or two from the neighbouring states of Tamil Nadu, Karnataka and Andhra Pradesh which have achieved impressive growth of their IT industries. Kerala has all the intrinsic advantages in terms of infrastructure, manpower etc. but it lacks a suitable promotion strategy to attract domestic and foreign investors. Kerala can easily achieve software export figures comparable to other states in southern India. The kind of development envisaged along with the drive to computerise all sections of activity in the state will also open up a promising domestic market for IT products. The growth of software exports and domestic IT sector will definitely provide more employment opportunities to the educated and unemployed youth of the state.

Kerala Government’s IT policy, though progressive and comprehensive, has failed to provide an economic linkage between IT industry and E-governance. Consequently, more emphasis needs to be given to the design of e-governance projects. Also, policy objectives have not been linked with the financial capacity of the state and hence the various projects could not be completed within the given time frame.

Large scale promotion of the IT industry through domestic and foreign investment, higher level of PC penetration and timely implementation of E-governance projects should be the thrust areas of the next IT policy. Moreover, the targets are to be linked with the availability of resources within the stipulated period. It may be recalled that in the ‘Kerala model development’, the state achieved substantial social development but economic development is at a standstill. This is no longer considered as an acceptable model as the state is finding it difficult to sustain the social development due to low economic growth.
Similarly, in this era of IT development, if the state fails to achieve growth of IT industry and deeper PC penetration, it may find difficult to maintain the tempo of IT development in E-governance.

6. References:


Government of Kerala (1998a) IT policy of the Kerala Government.


